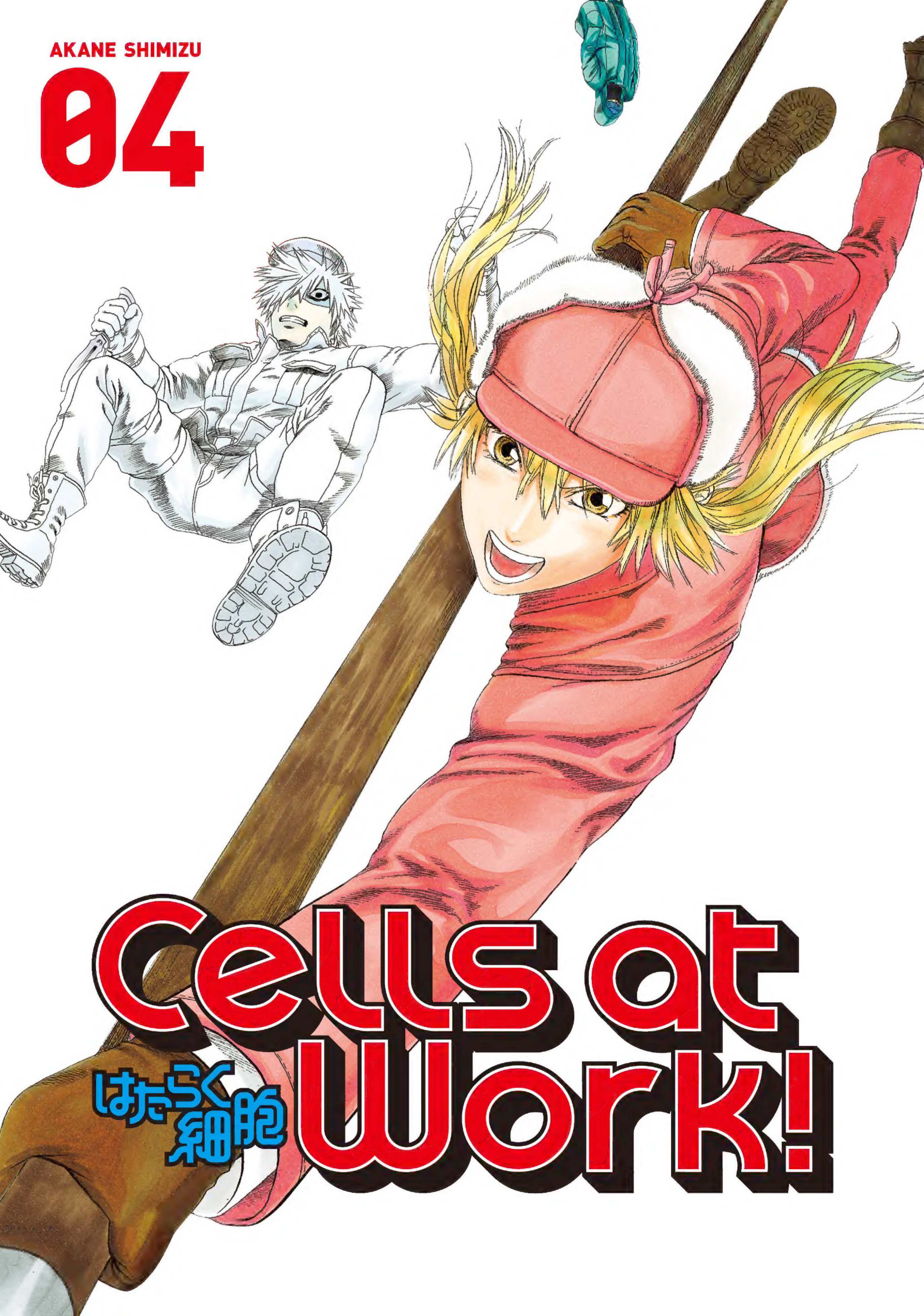
AKANE SHIMIZU

# 04



# Cells at Work!

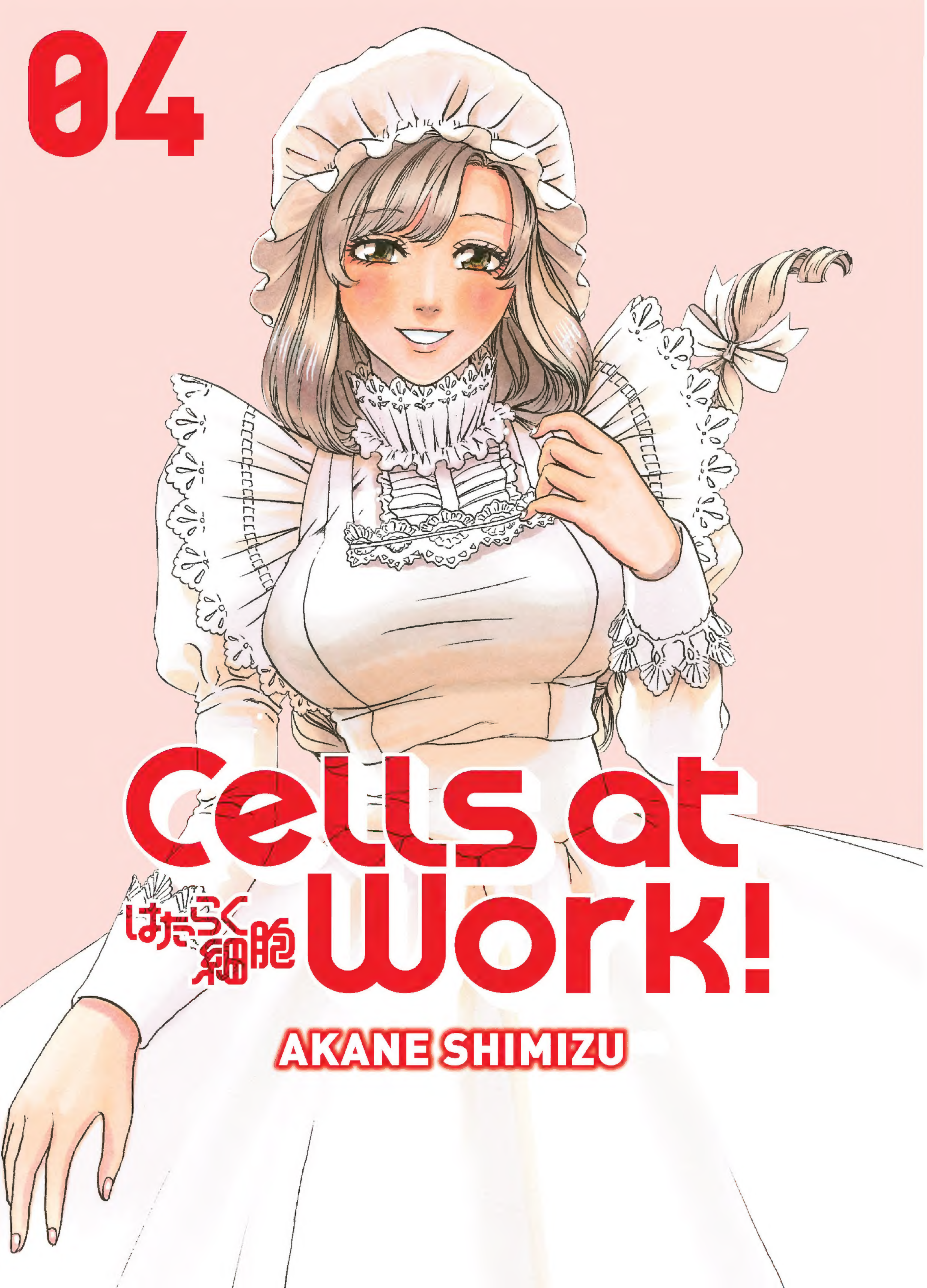
はたらく細胞

# Cells at Work!

はたらく細胞

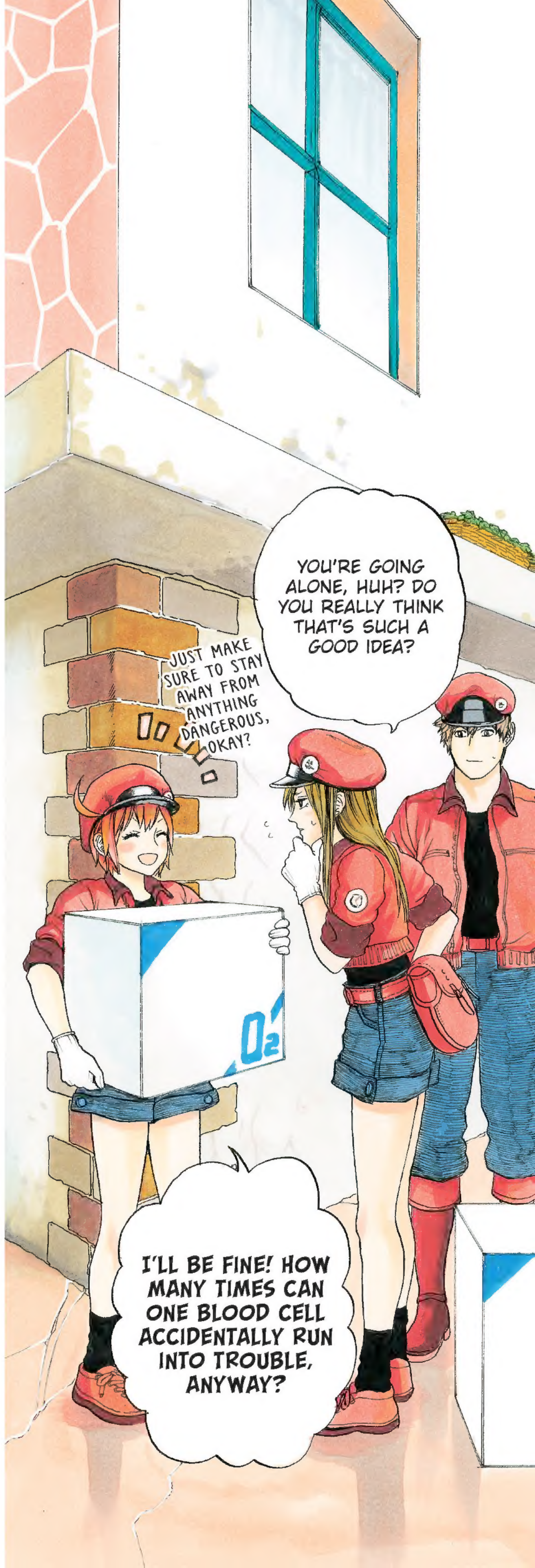
## 04

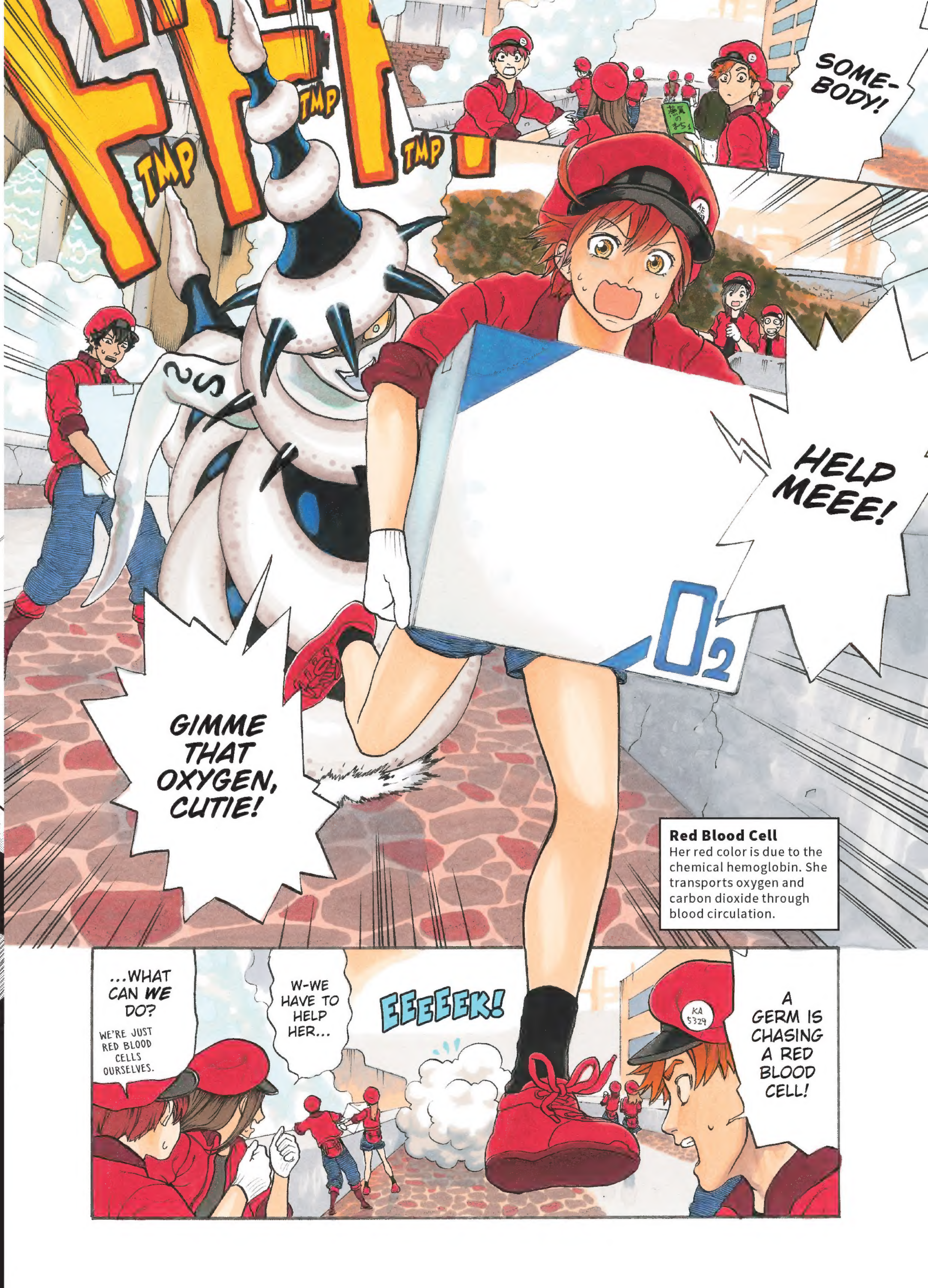
**AKANE SHIMIZU**


04
Cells at Work!
はたらく細胞
AKANE SHIMIZU

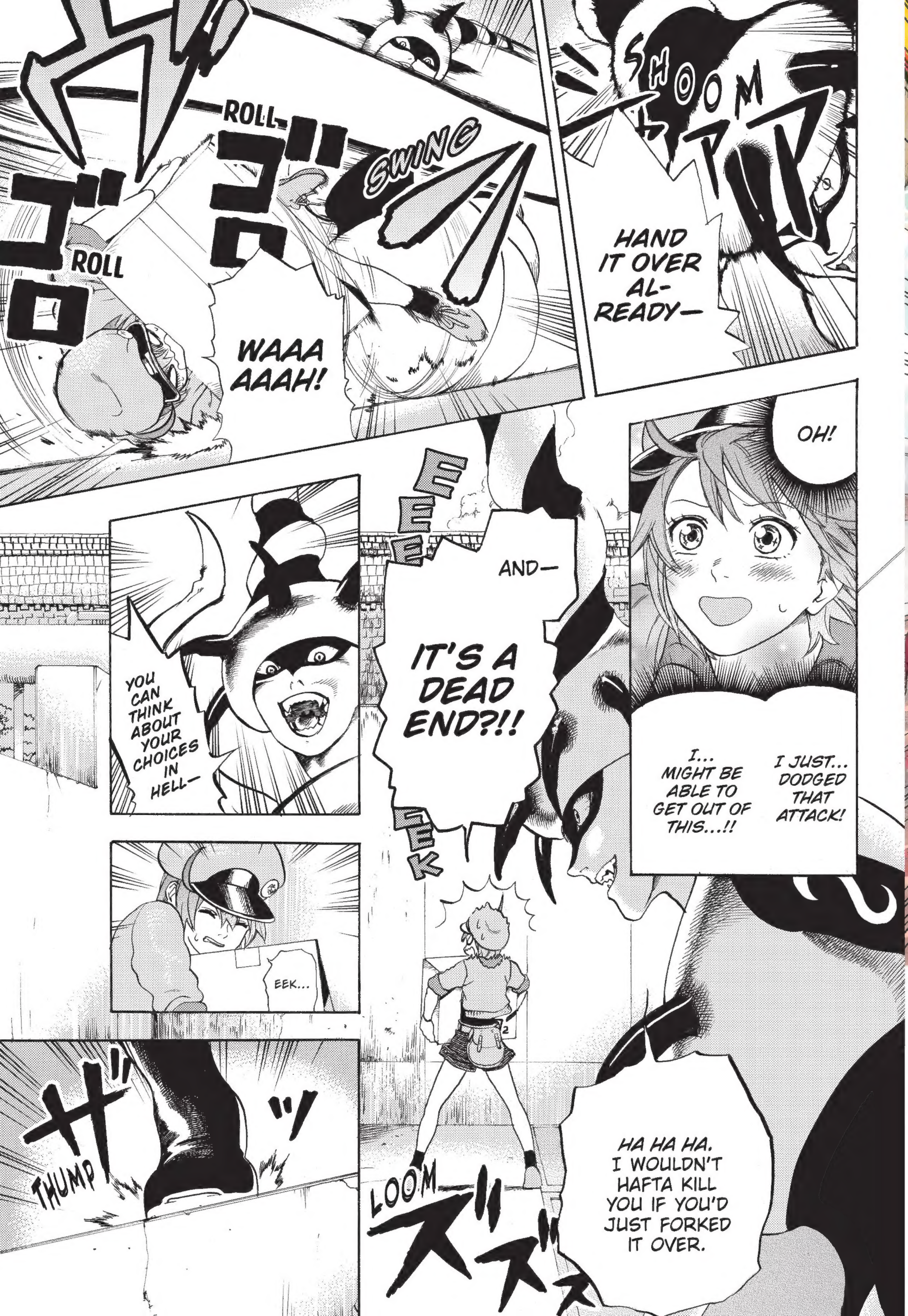
## CONTENTS

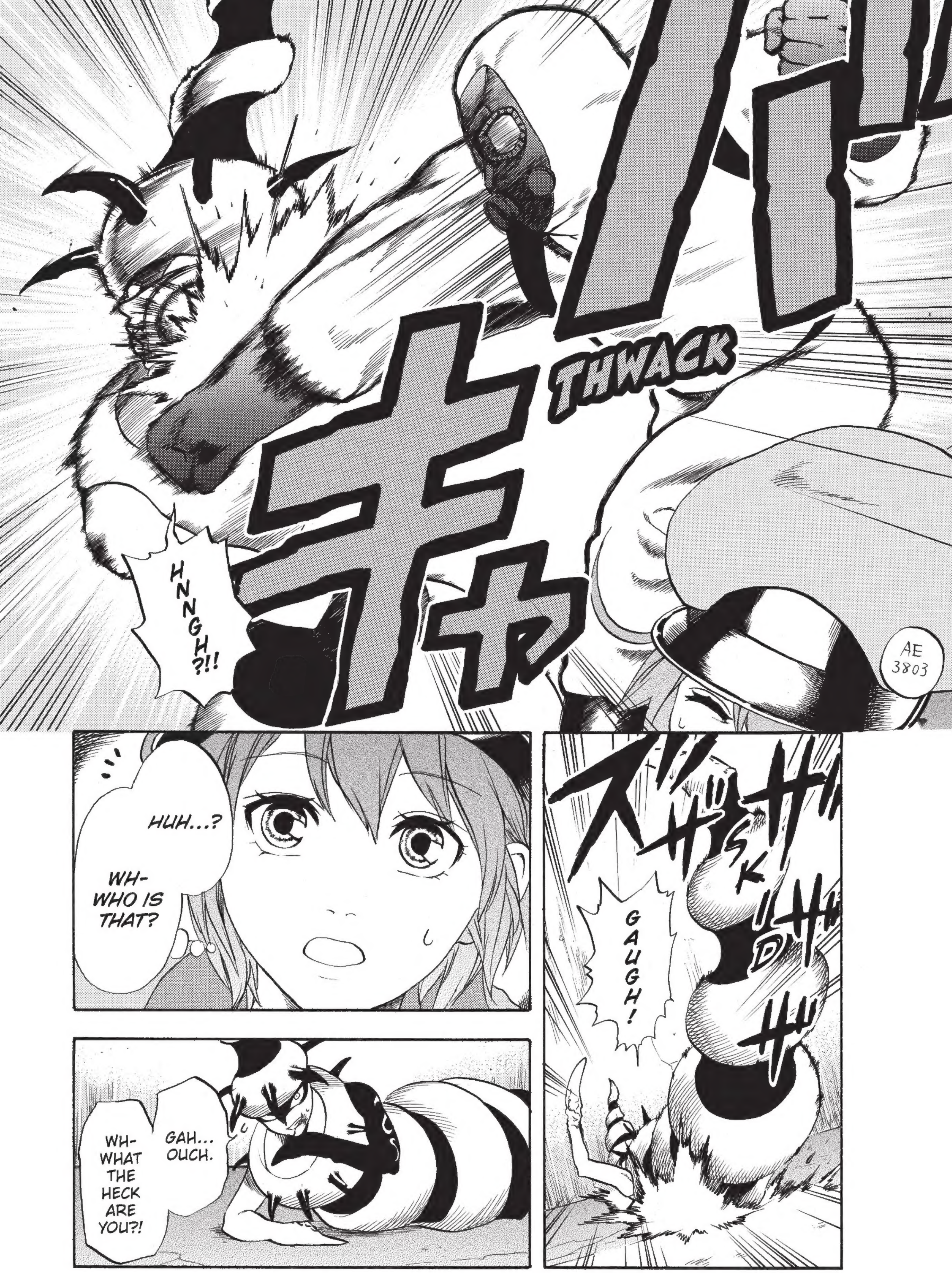
Chapter 15 *Staphylococcus aureus* 004
Chapter 16 Dengue Fever 035
Chapter 17 Hypovolemic Shock (Part I) 067
Chapter 18 Hypovolemic Shock (Part II) 101
Chapter 19 Peyer's Patch 139

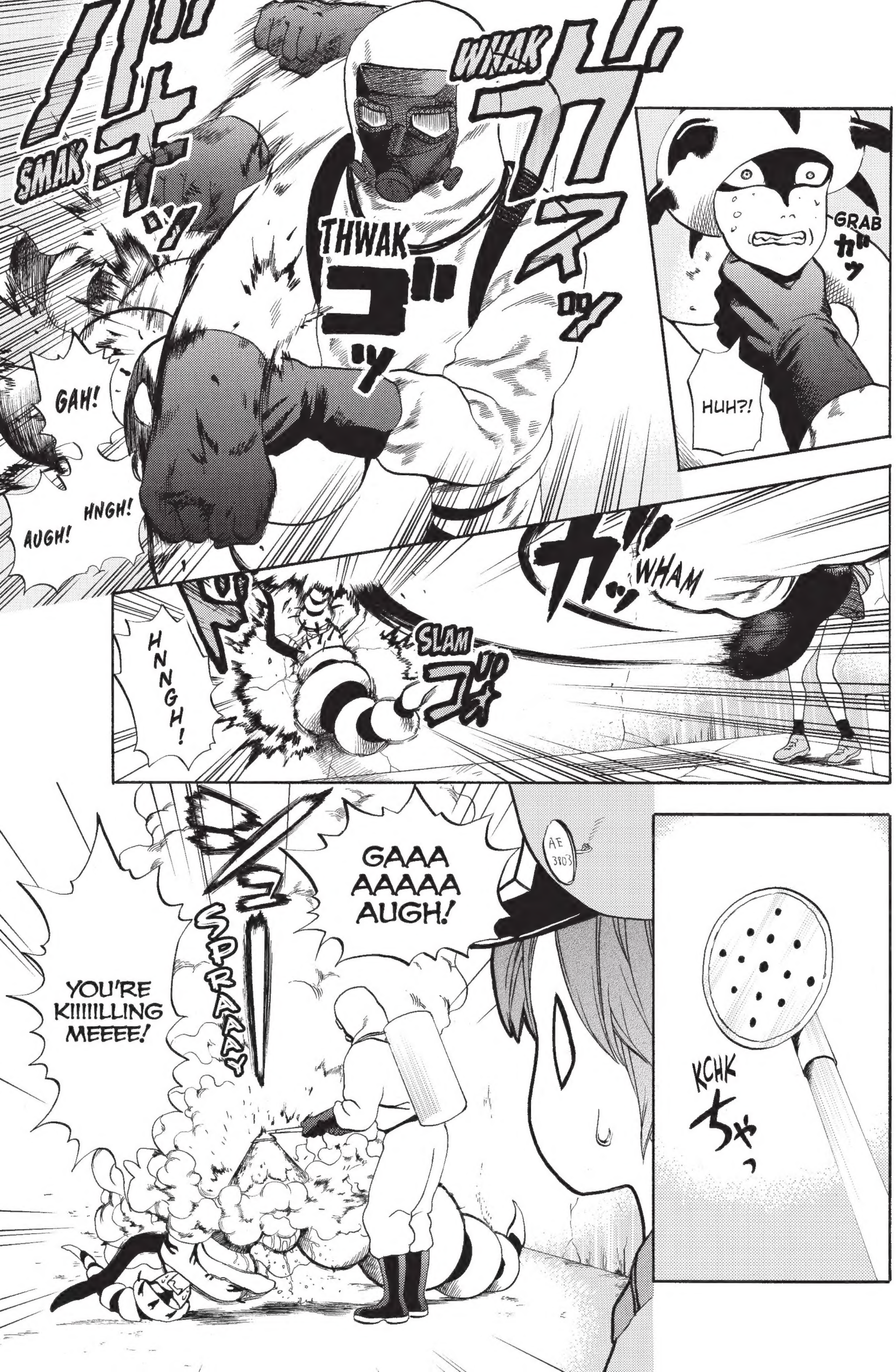

YOU'RE GOING ALONE, HUH? DO YOU REALLY THINK THAT'S SUCH A GOOD IDEA?
JUST MAKE SURE TO STAY AWAY FROM ANYTHING DANGEROUS, OKAY?
O₂
I'LL BE FINE! HOW MANY TIMES CAN ONE BLOOD CELL ACCIDENTALLY RUN INTO TROUBLE, ANYWAY?


TMP
TMP
TMP
TMP
SOMEBODY!
HELP MEEE!
GIMME THAT OXYGEN, CUTIE!
$O_2$
A GERM IS CHASING A RED BLOOD CELL!
KA 5329
EEEEEK!
W-WE HAVE TO HELP HER...
...WHAT CAN WE DO?
WE'RE JUST RED BLOOD CELLS OURSELVES.

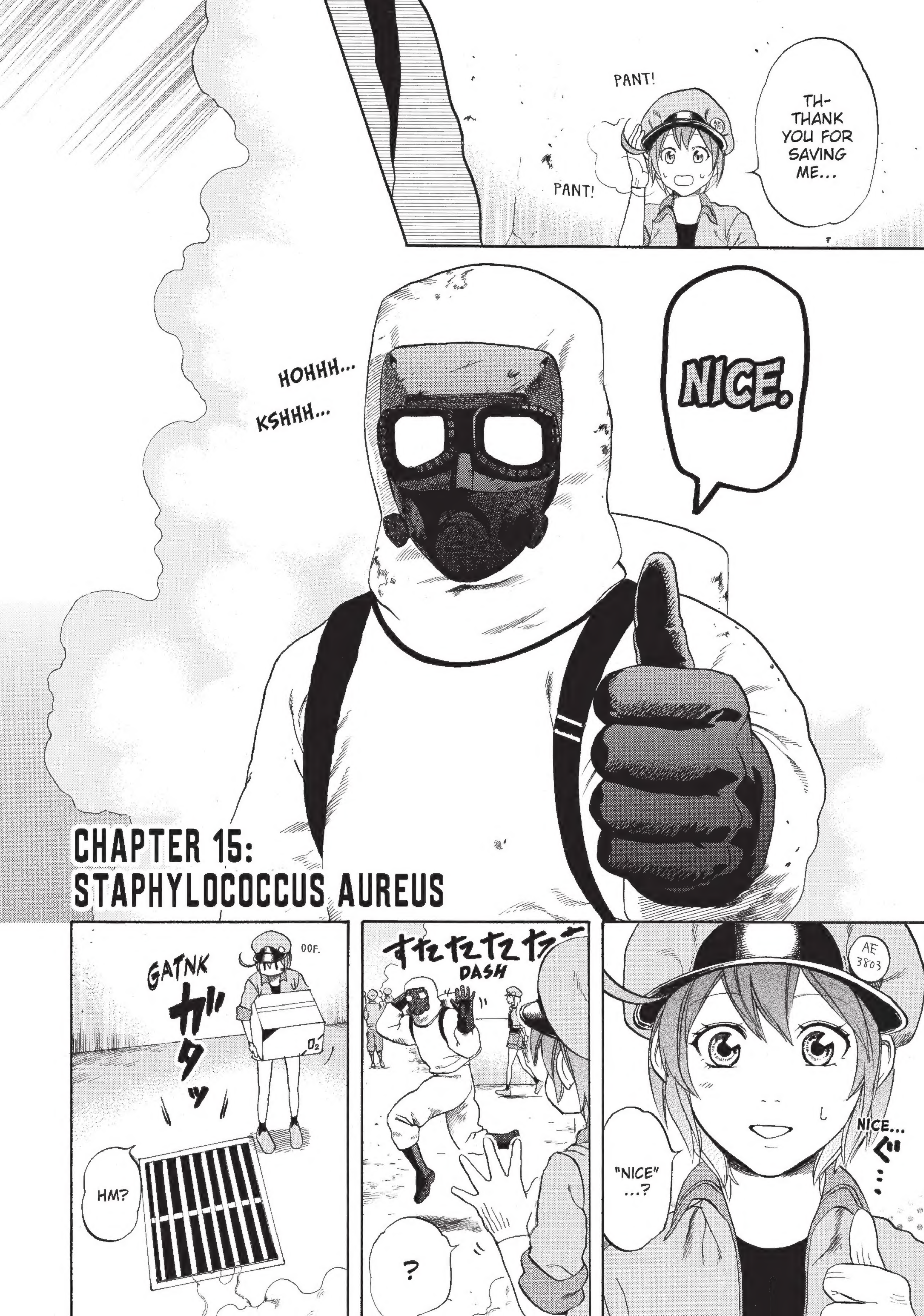
**Red Blood Cell**
Her red color is due to the chemical hemoglobin. She transports oxygen and carbon dioxide through blood circulation.

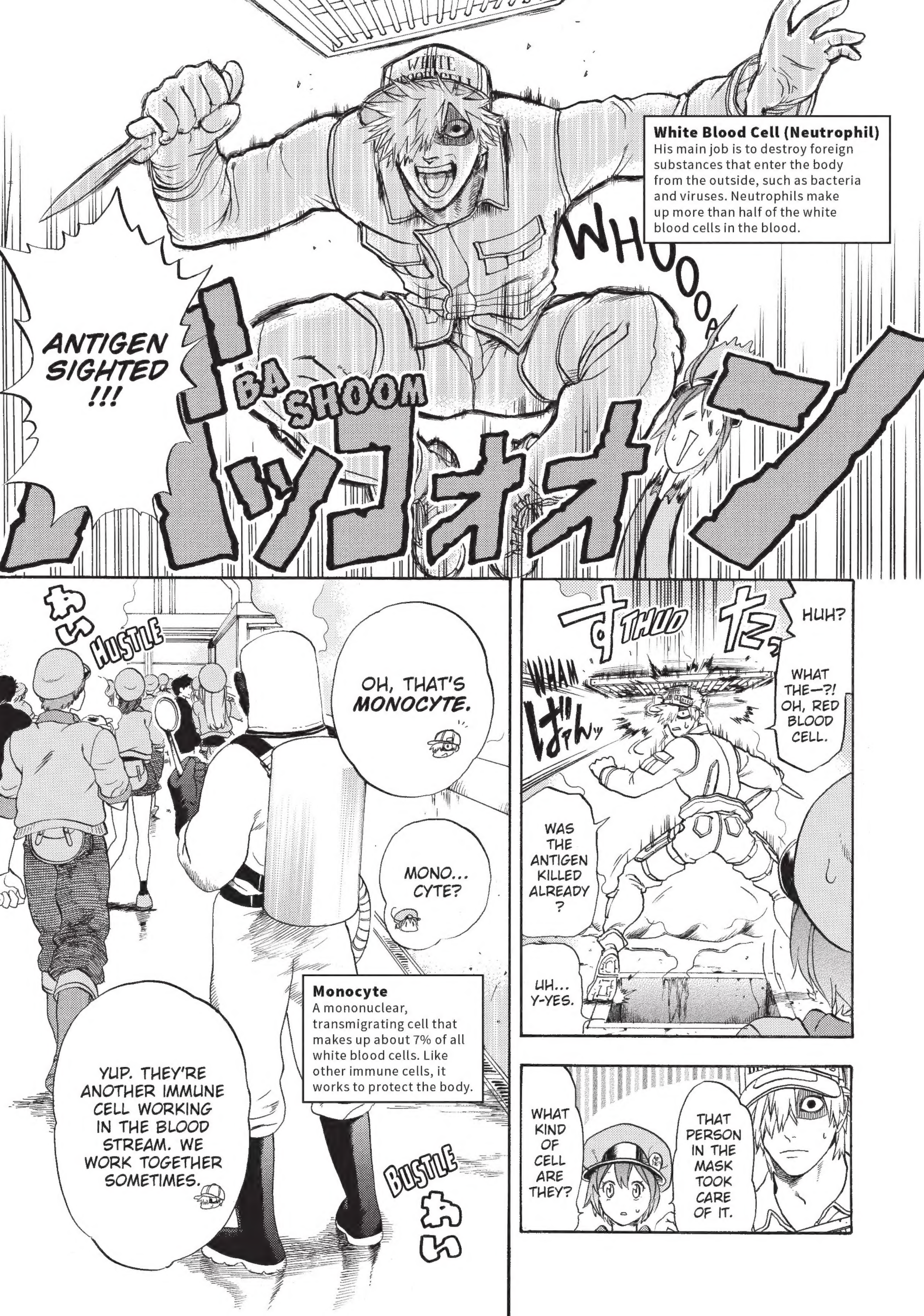

SHOOM
HAND IT OVER ALREADY—
SWING
ROLL
ROLL
WAAAAAAH!
OH!
I JUST... DODGED THAT ATTACK!
I... MIGHT BE ABLE TO GET OUT OF THIS...!!
AND—
IT'S A DEAD END?!!
EEE
YOU CAN THINK ABOUT YOUR CHOICES IN HELL—
EEK
EEK...
HA HA HA. I WOULDN'T HAFTA KILL YOU IF YOU'D JUST FORKED IT OVER.
LOOM
THUMP


バキャ
THWACK
HNNGH?!!
AE 3803
ズザザザザ
SKID
GAUGH!
HUH...?
WH- WHO IS THAT?
GAH... OUCH.
WH- WHAT THE HECK ARE YOU?!


GRAB
ガッ
HUH?!
WHAK
SMAK
THWAK
ゴッ
GAH!
HNGH!
AUGH!
WHAM
ガッ
SLAM
HNNGH!
AE 3803
KCHK
ちゃっ
GAAA AAAAA AUGH!
SPRAAAAY
YOU'RE KIIIIIILLING MEEEE!

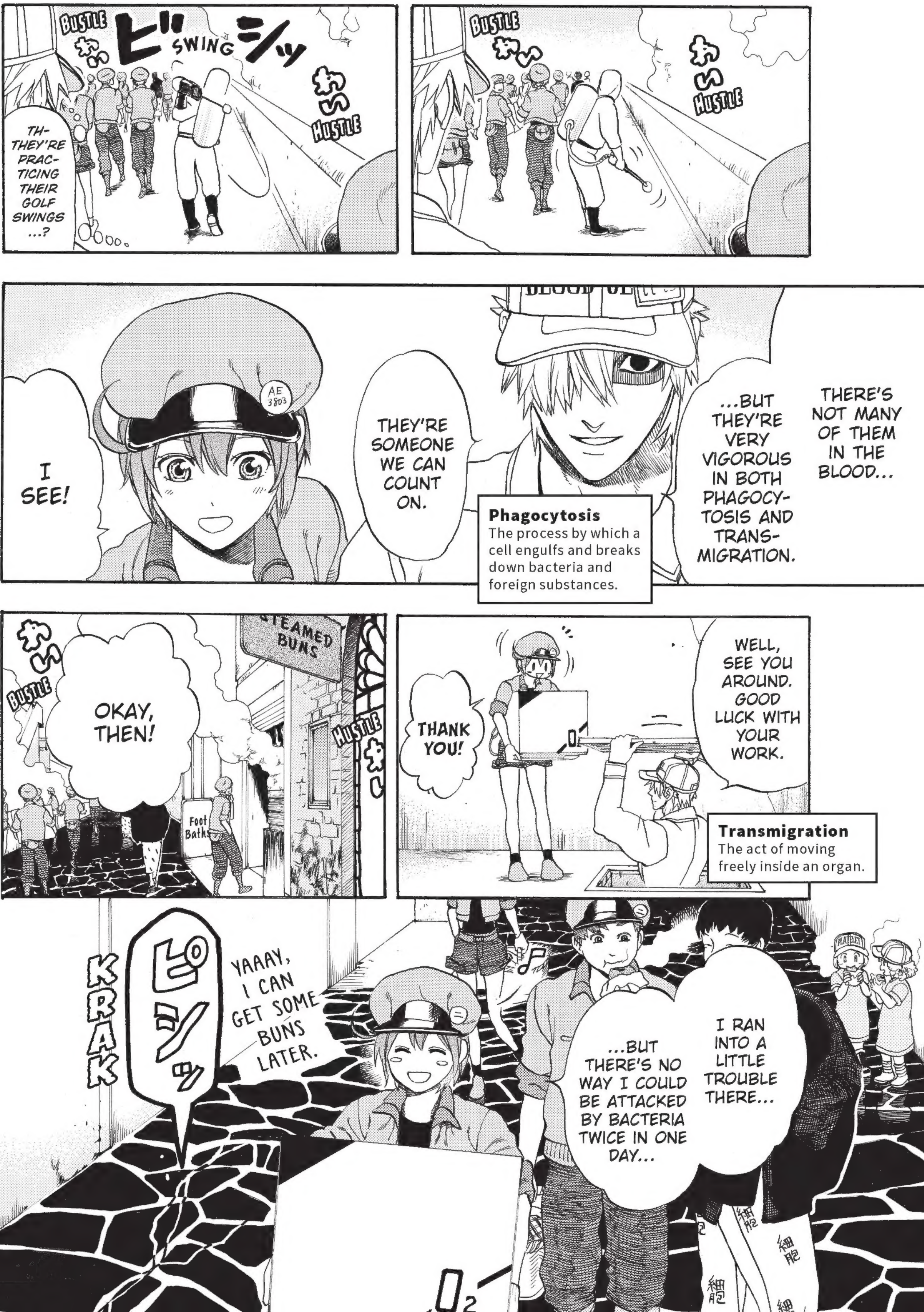
# CHAPTER 15: STAPHYLOCOCCUS AUREUS


TH-THANK YOU FOR SAVING ME...
PANT!
PANT!
NICE.
HOHHH...
KSHHH...
AE 3803
NICE... ぐ…
"NICE" ...?
すたたたたた
DASH
?
OOF.
GATNK
ガタッ
O2
HM?


WHOOOA
ANTIGEN SIGHTED !!!
BA SHOOM
ドッゴオオン
たっ
THUD
す
HUH?
WHAT THE—?! OH, RED BLOOD CELL.
WHAM
ばぁんッ
WAS THE ANTIGEN KILLED ALREADY ?
UH... Y-YES.
THAT PERSON IN THE MASK TOOK CARE OF IT.
WHAT KIND OF CELL ARE THEY?
わい
HUSTLE
OH, THAT'S *MONOCYTE.*
MONO... CYTE?
YUP. THEY'RE ANOTHER IMMUNE CELL WORKING IN THE BLOOD STREAM. WE WORK TOGETHER SOMETIMES.
BUSTLE
わい

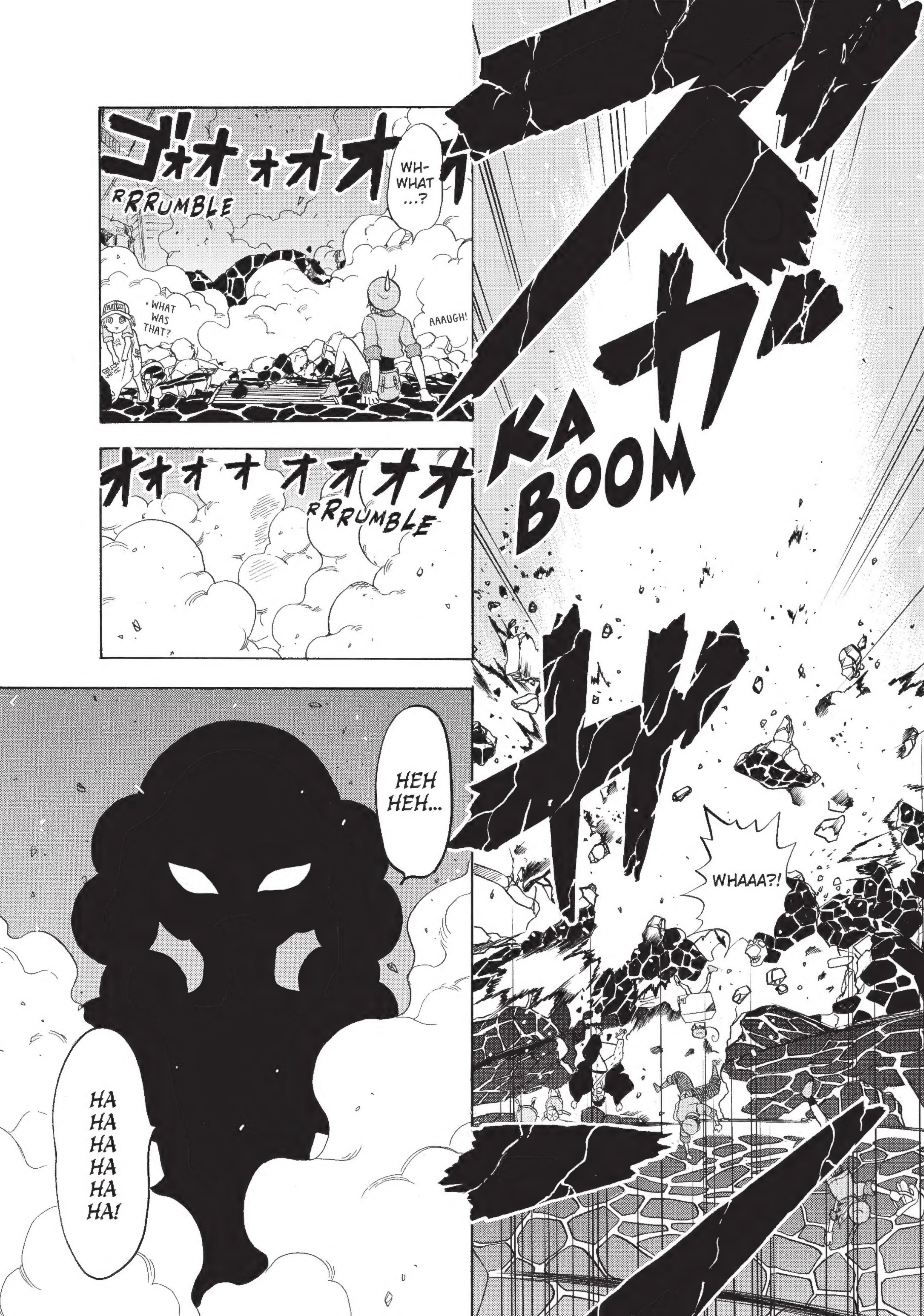
**White Blood Cell (Neutrophil)**
His main job is to destroy foreign substances that enter the body from the outside, such as bacteria and viruses. Neutrophils make up more than half of the white blood cells in the blood.

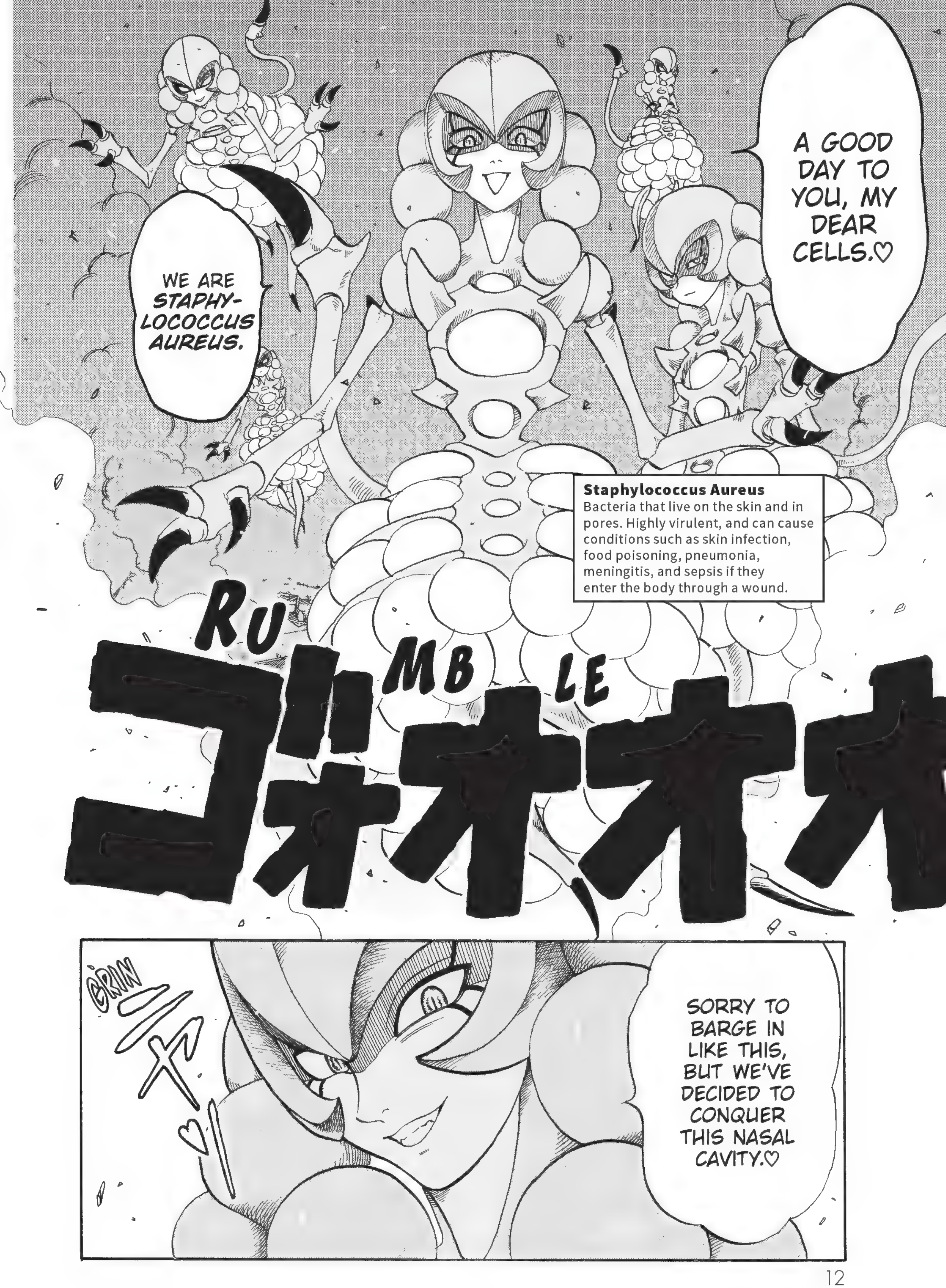
**Monocyte**
A mononuclear, transmigrating cell that makes up about 7% of all white blood cells. Like other immune cells, it works to protect the body.


HUSTLE
わい
わい
BUSTLE
わい
HUSTLE
シッ
SWING
ビ
わい
BUSTLE
TH-THEY'RE PRACTICING THEIR GOLF SWINGS ...?
THERE'S NOT MANY OF THEM IN THE BLOOD...
...BUT THEY'RE VERY VIGOROUS IN BOTH PHAGOCYTOSIS AND TRANSMIGRATION.
THEY'RE SOMEONE WE CAN COUNT ON.
AE 3803
I SEE!
WELL, SEE YOU AROUND. GOOD LUCK WITH YOUR WORK.
THANK YOU!
HUSTLE
わい
STEAMED BUNS
Foot Baths
OKAY, THEN!
わい
BUSTLE
I RAN INTO A LITTLE TROUBLE THERE...
...BUT THERE'S NO WAY I COULD BE ATTACKED BY BACTERIA TWICE IN ONE DAY...
YAAAY, I CAN GET SOME BUNS LATER.
ピシッ
KRAK
$O_2$
細胞

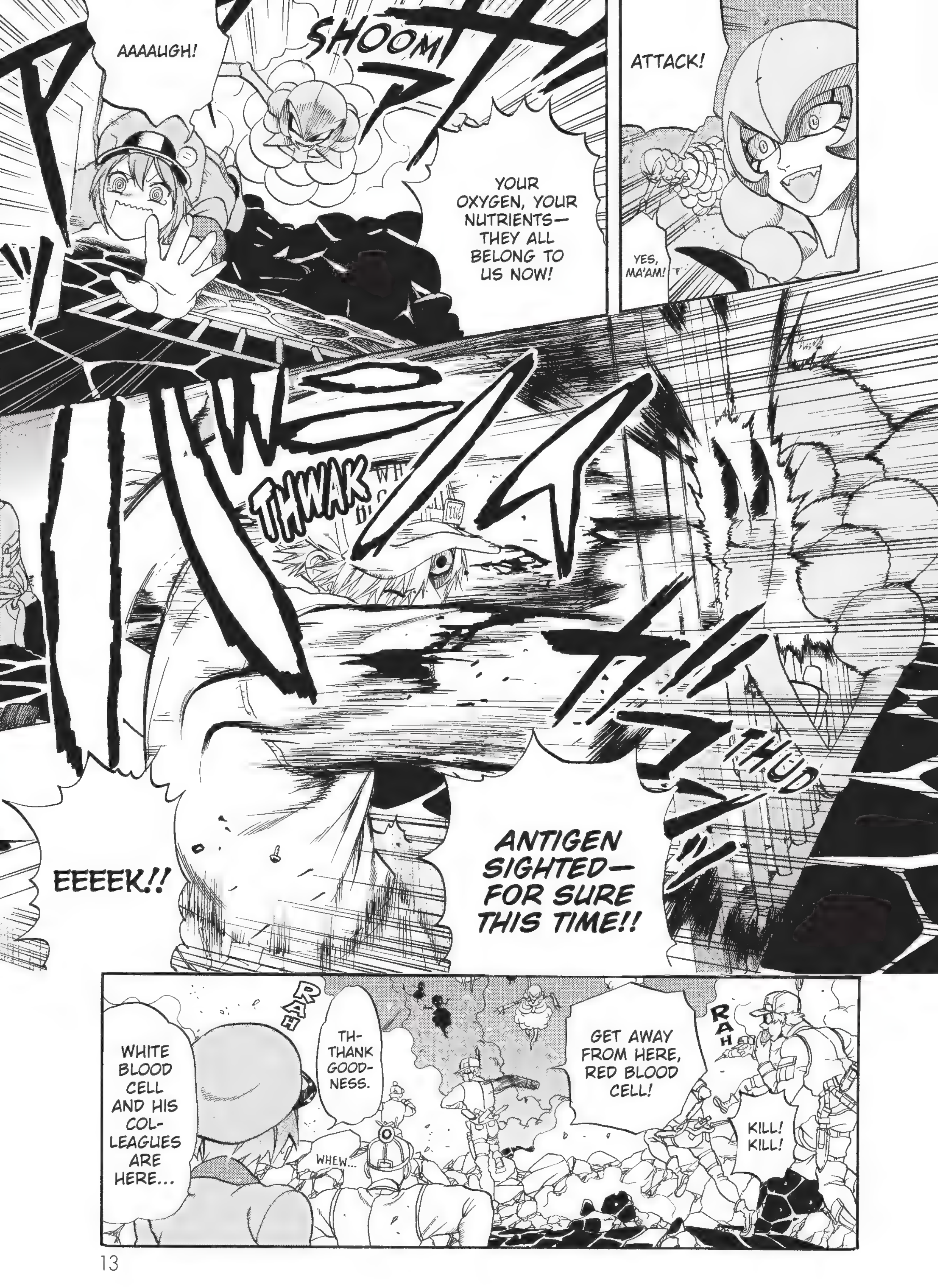
**Phagocytosis**
The process by which a cell engulfs and breaks down bacteria and foreign substances.

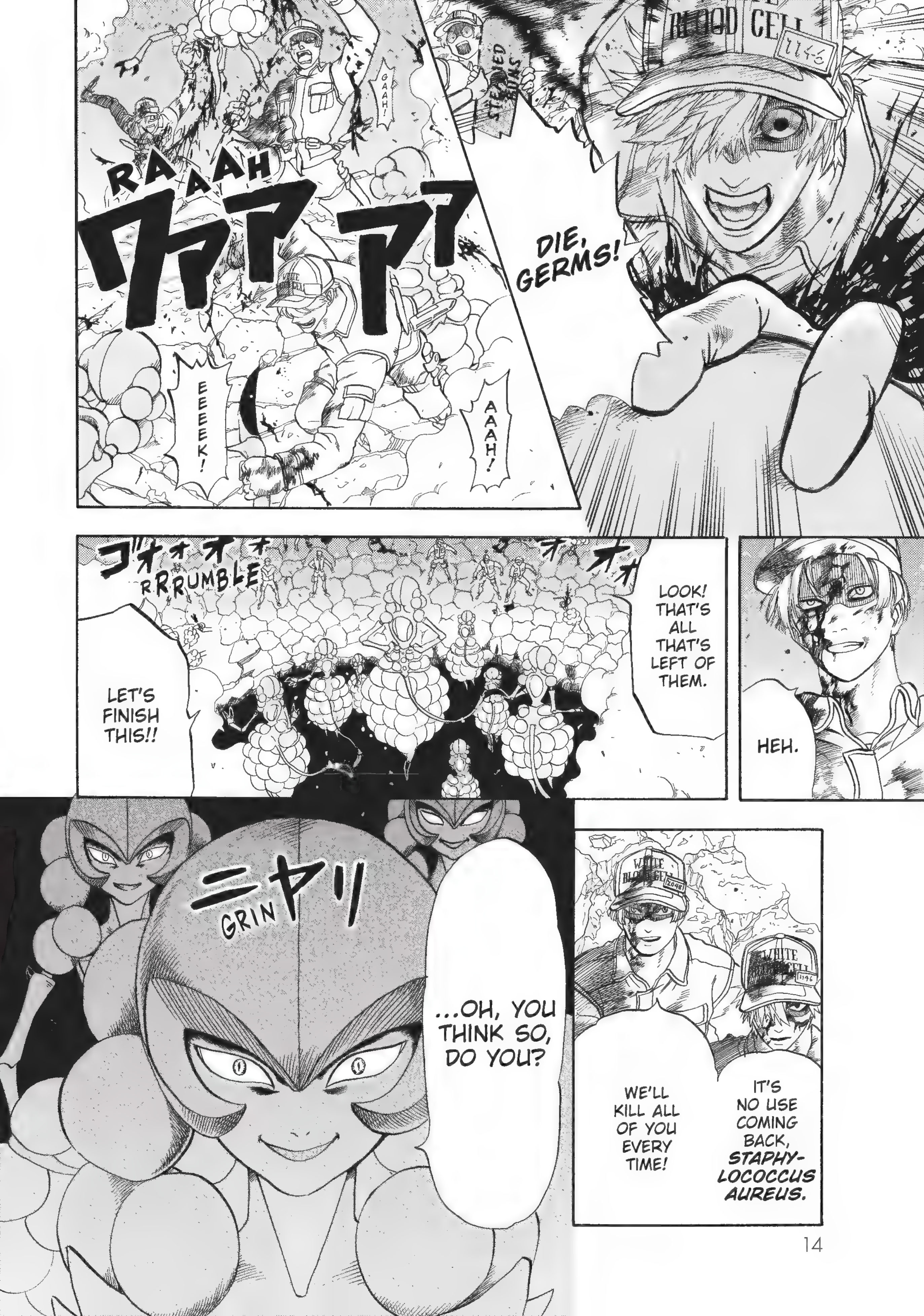
**Transmigration**
The act of moving freely inside an organ.

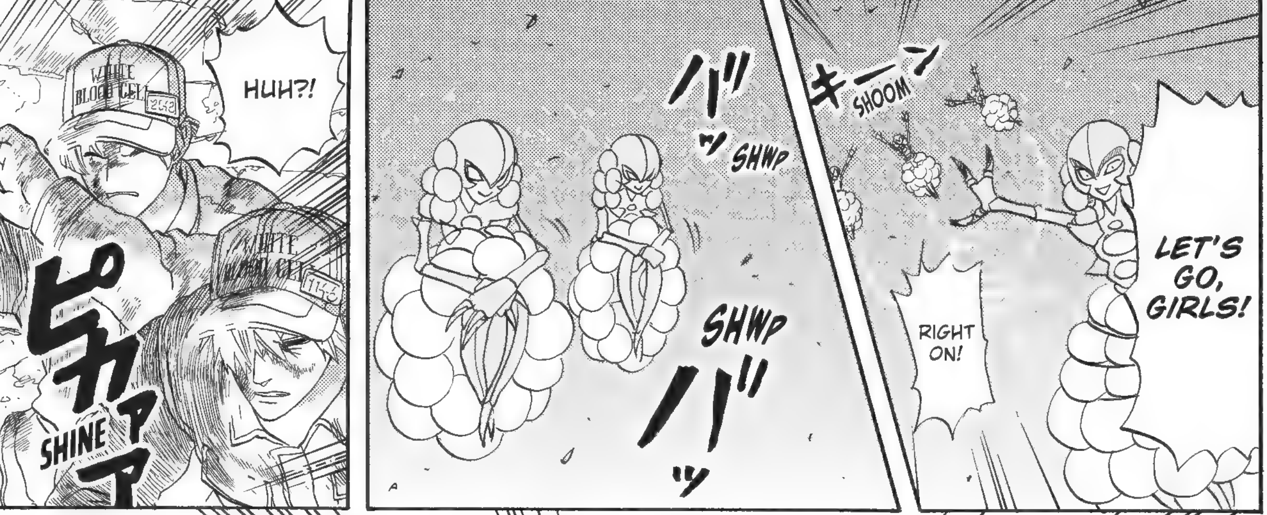

KA BOOM
WHAAA?!
ゴォオォオオオ
RRRUMBLE
WH- WHAT ...?
AAAUGH!
WHAT WAS THAT?
オォォオ オオオオ
RRRUMBLE
HEH HEH...
HA HA HA HA HA HA HA!

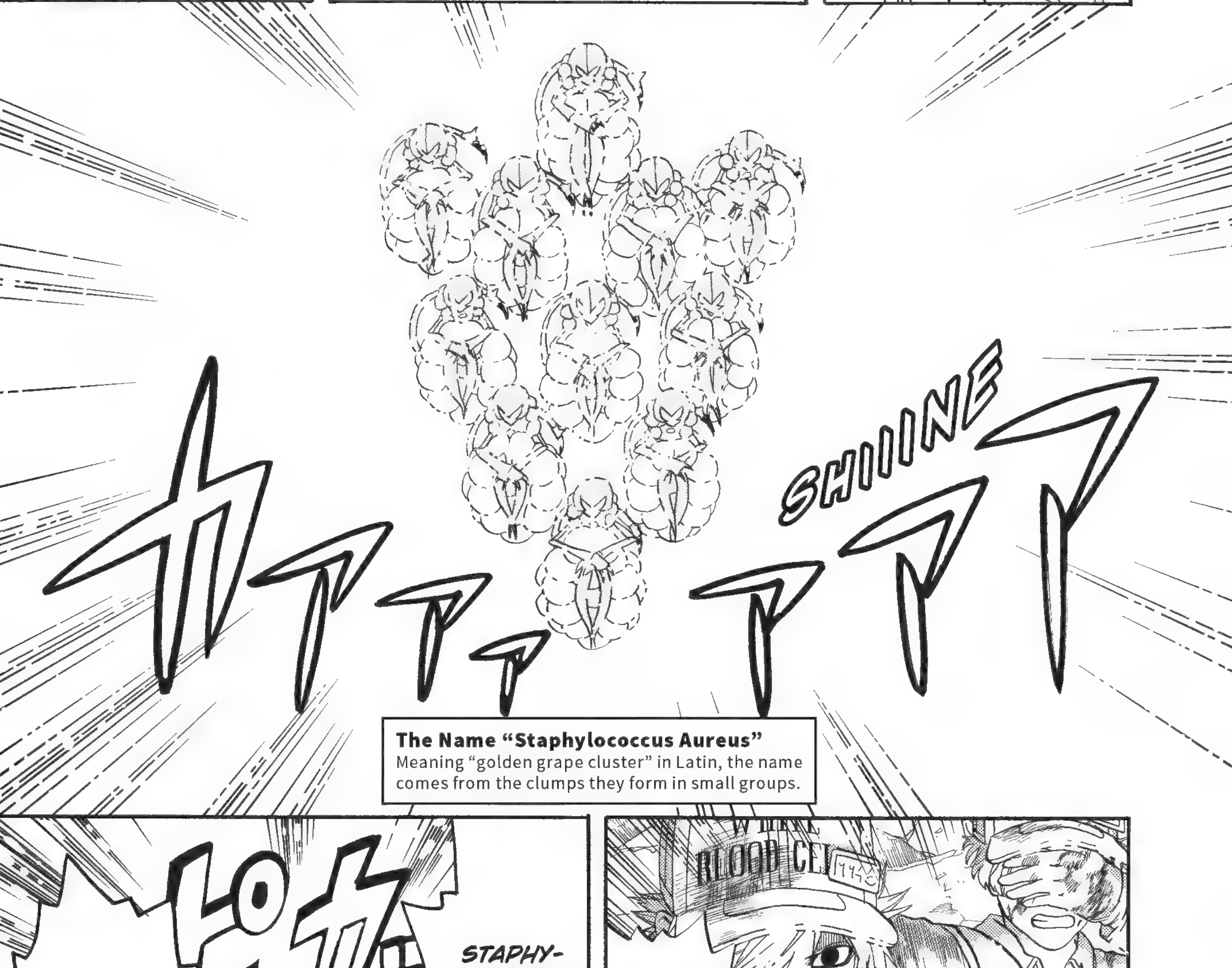

A GOOD DAY TO YOU, MY DEAR CELLS.♡
WE ARE STAPHYLOCOCCUS AUREUS.
RUMBLE
ゴォオオオ
GRIN
ニヤ♡
SORRY TO BARGE IN LIKE THIS, BUT WE'VE DECIDED TO CONQUER THIS NASAL CAVITY.♡

**Staphylococcus Aureus**
Bacteria that live on the skin and in pores. Highly virulent, and can cause conditions such as skin infection, food poisoning, pneumonia, meningitis, and sepsis if they enter the body through a wound.

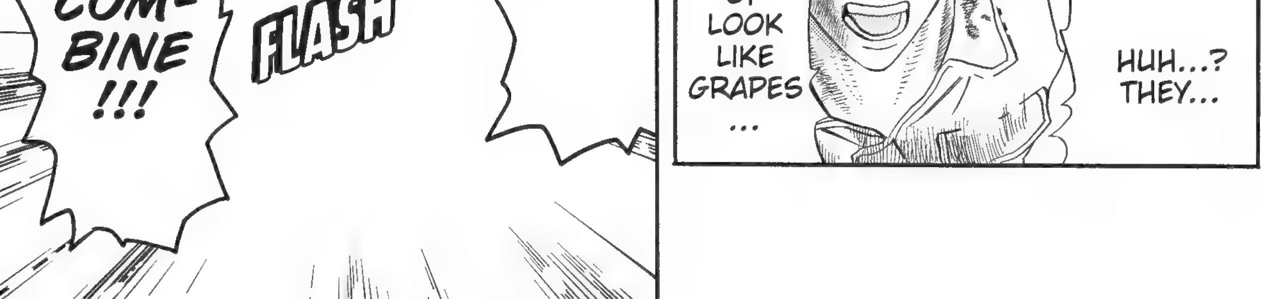

ATTACK!
YES, MA'AM!
SHOOM
AAAAUGH!
YOUR OXYGEN, YOUR NUTRIENTS—THEY ALL BELONG TO US NOW!
THWAK
THUD
ANTIGEN SIGHTED—FOR SURE THIS TIME!!
EEEEK!!
RAH
GET AWAY FROM HERE, RED BLOOD CELL!
KILL! KILL!
RAH
TH-THANK GOODNESS.
WHEW...
WHITE BLOOD CELL AND HIS COLLEAGUES ARE HERE...

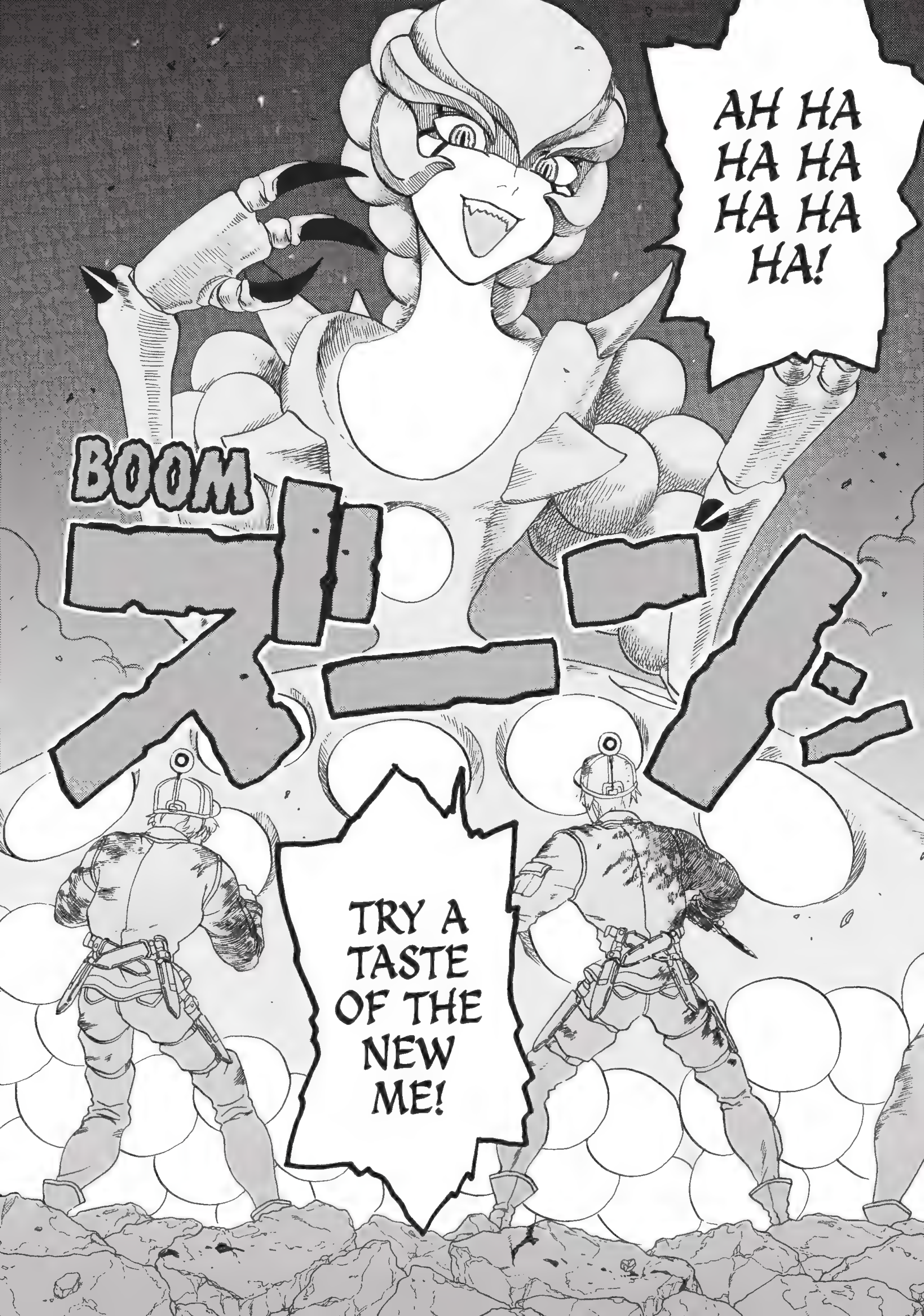

WHITE BLOOD CELL 1146
DIE, GERMS!
STERILIZED BAGS
GAAH!
RAAAH
ワァアア
EEEEK!
AAAH!
HEH.
LOOK! THAT'S ALL THAT'S LEFT OF THEM.
ゴォォオオ オオ
RRRUMBLE
LET'S FINISH THIS!!
WHITE BLOOD CELL 2048
WHITE BLOOD CELL 1146
IT'S NO USE COMING BACK, **STAPHYLOCOCCUS AUREUS.**
WE'LL KILL ALL OF YOU EVERY TIME!
...OH, YOU THINK SO, DO YOU?
ニヤリ
GRIN

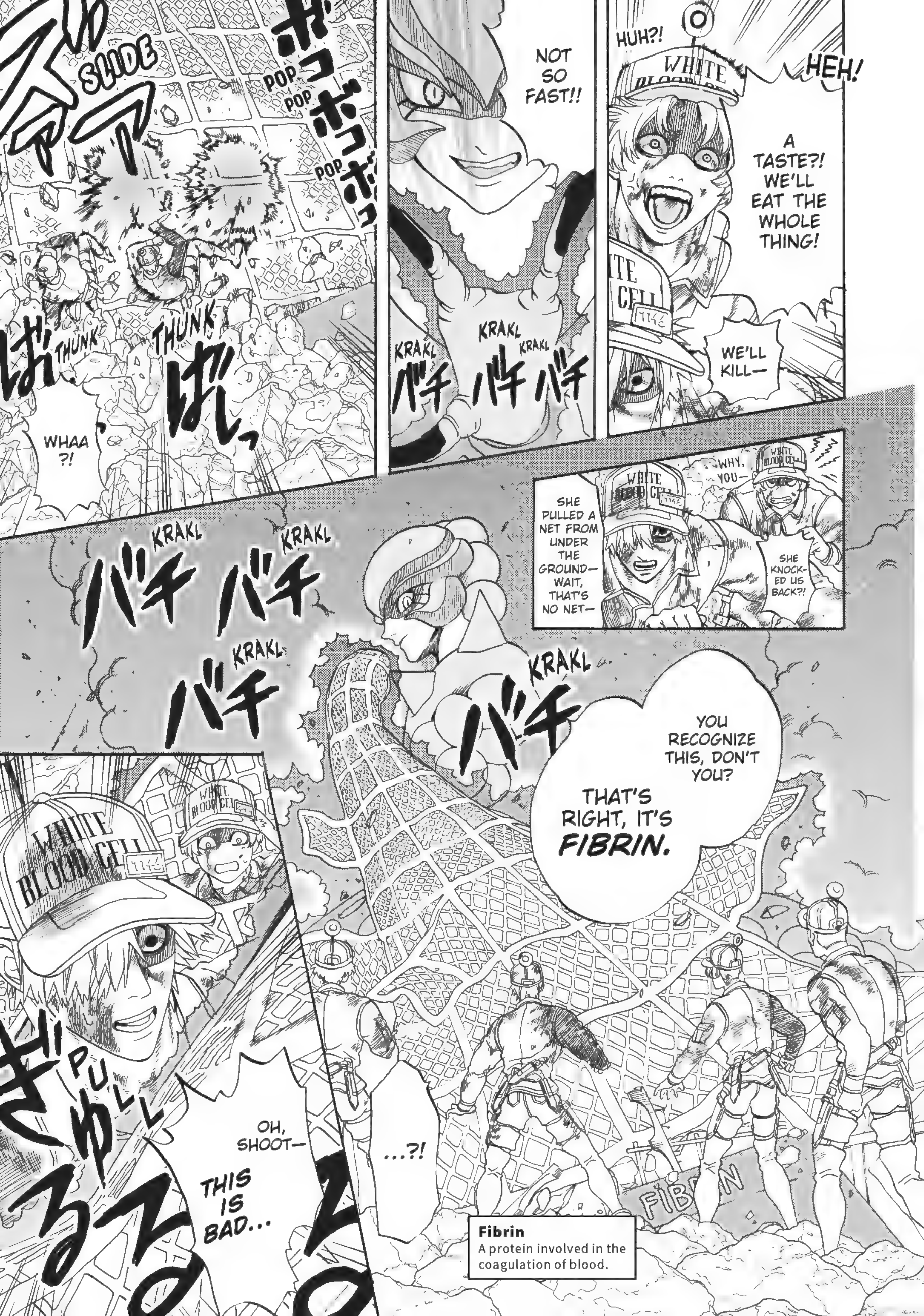

キーン
SHOOM
LET'S GO, GIRLS!
RIGHT ON!
バッ
SHWP
SHWP
バッ
HUH?!
ピカァ
SHINE


カァァァァァ
SHIIINE

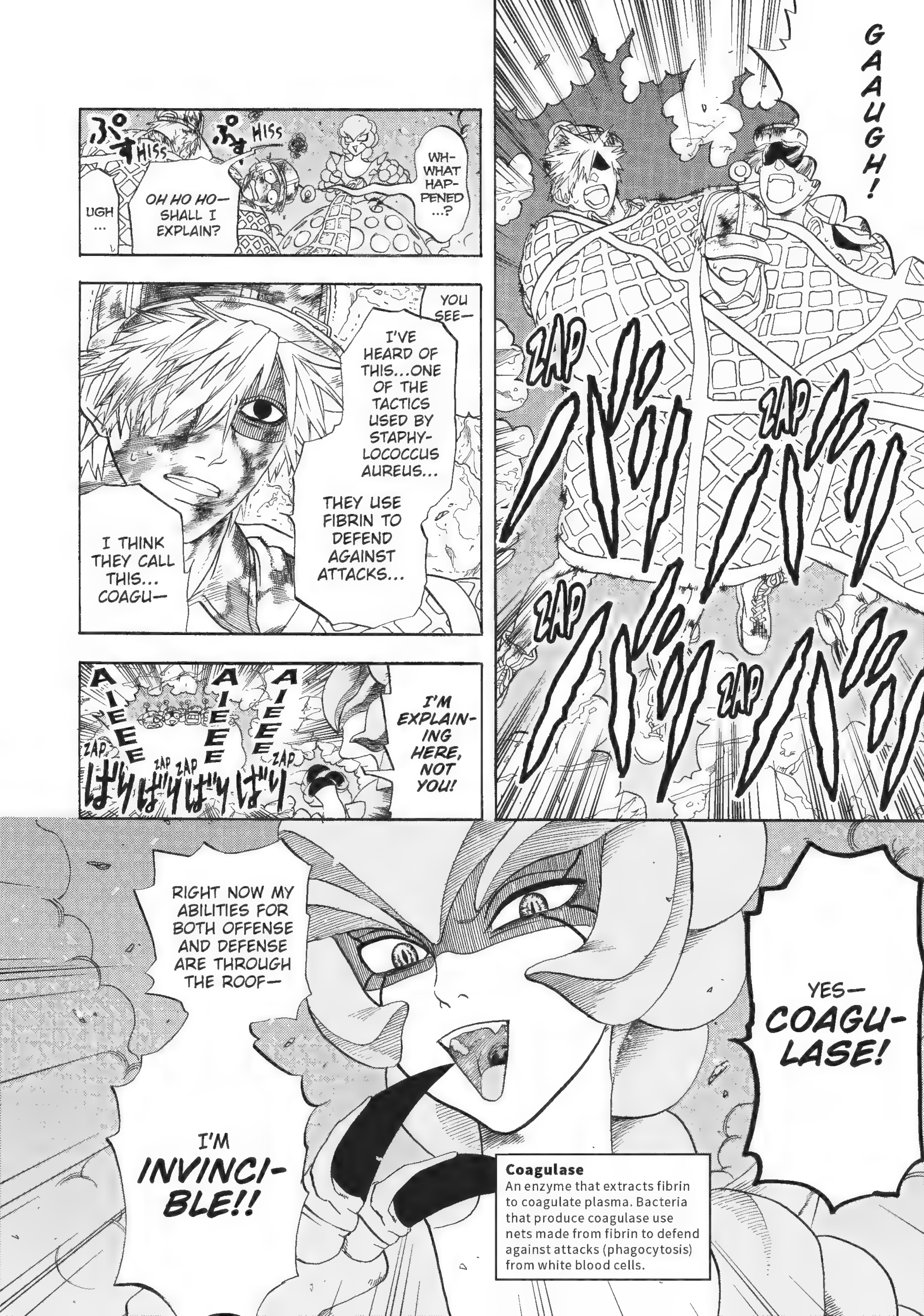
**The Name "Staphylococcus Aureus"**
Meaning "golden grape cluster" in Latin, the name comes from the clumps they form in small groups.


HUH...? THEY...
...KIND OF LOOK LIKE GRAPES...
STAPHYLOCOCCUS AUREUS—
COMBINE!!!
ピカッ
FLASH

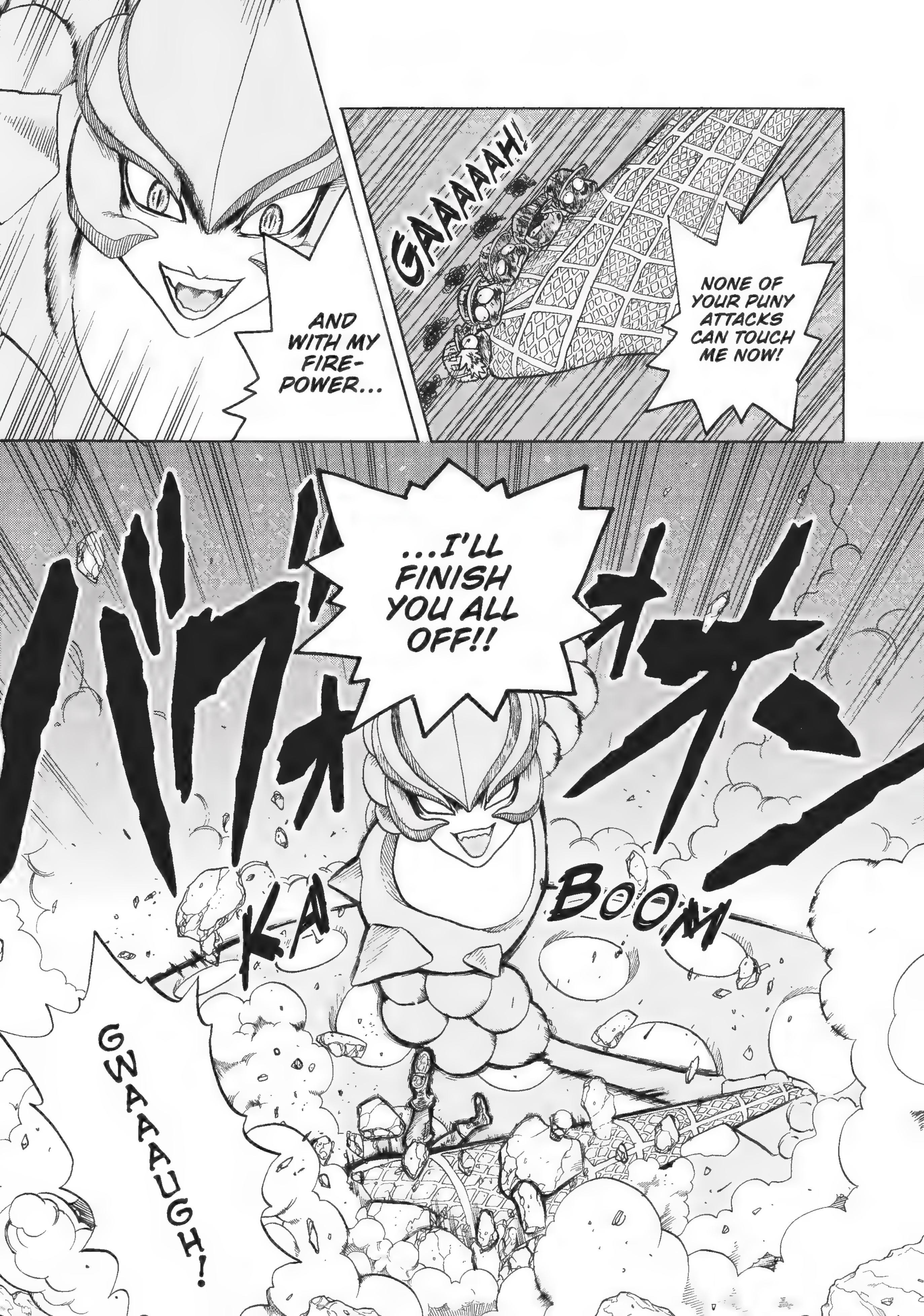

AH HA HA HA HA HA HA!
BOOM
ズーン
TRY A TASTE OF THE NEW ME!

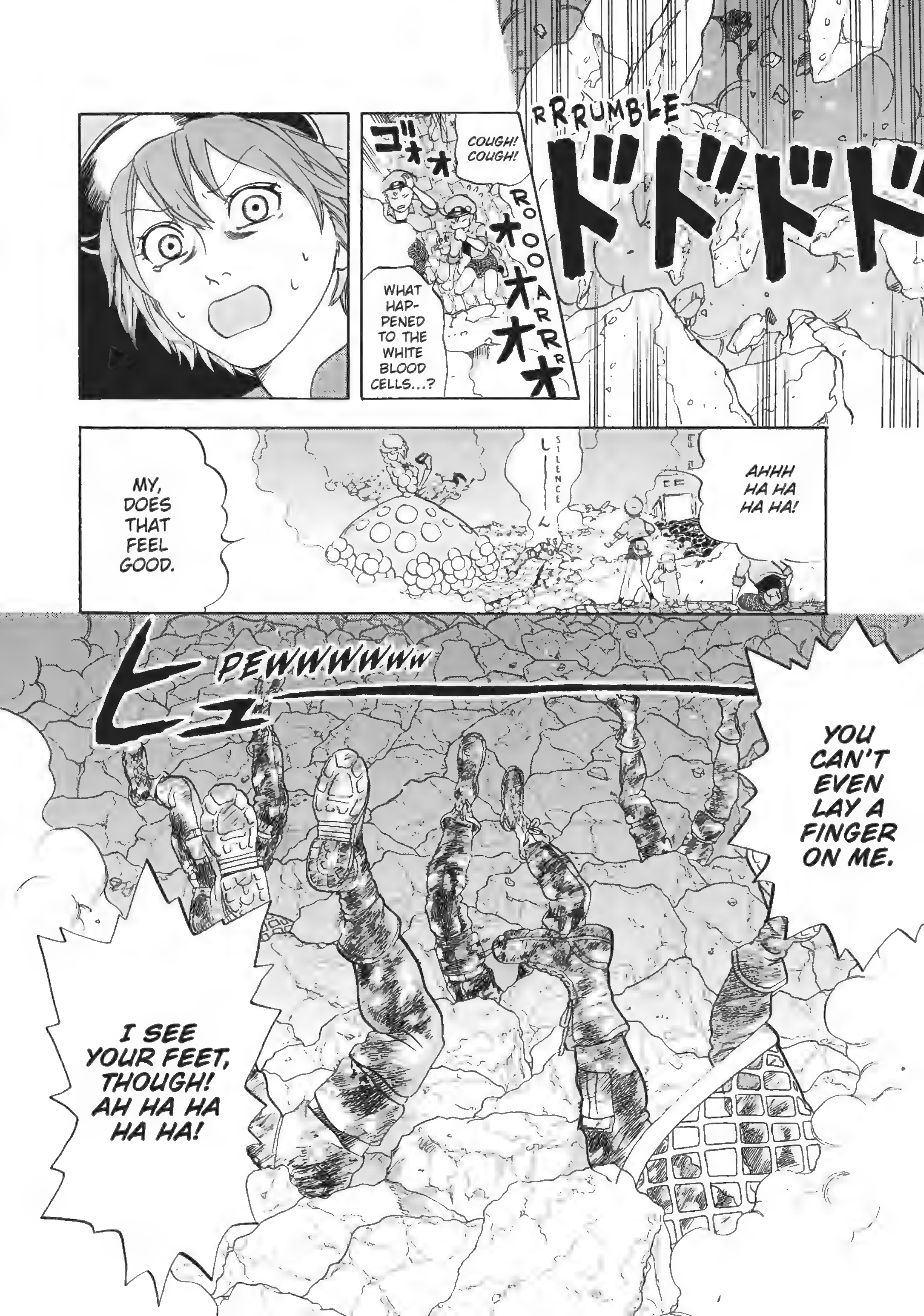

HUH?!
HEH!
A TASTE?! WE'LL EAT THE WHOLE THING!
WE'LL KILL—
NOT SO FAST!!
KRAKL バチ KRAKL バチ KRAKL バチ
SLIDE
POP POP POP
THUNK THUNK
WHAA ?!
WHY, YOU—
SHE KNOCKED US BACK?!
SHE PULLED A NET FROM UNDER THE GROUND— WAIT, THAT'S NO NET—
KRAKL バチ KRAKL バチ
KRAKL バチ KRAKL バチ
YOU RECOGNIZE THIS, DON'T YOU?
THAT'S RIGHT, IT'S *FIBRIN.*
FIBRIN
...?!
PULL
OH, SHOOT—
THIS IS BAD...

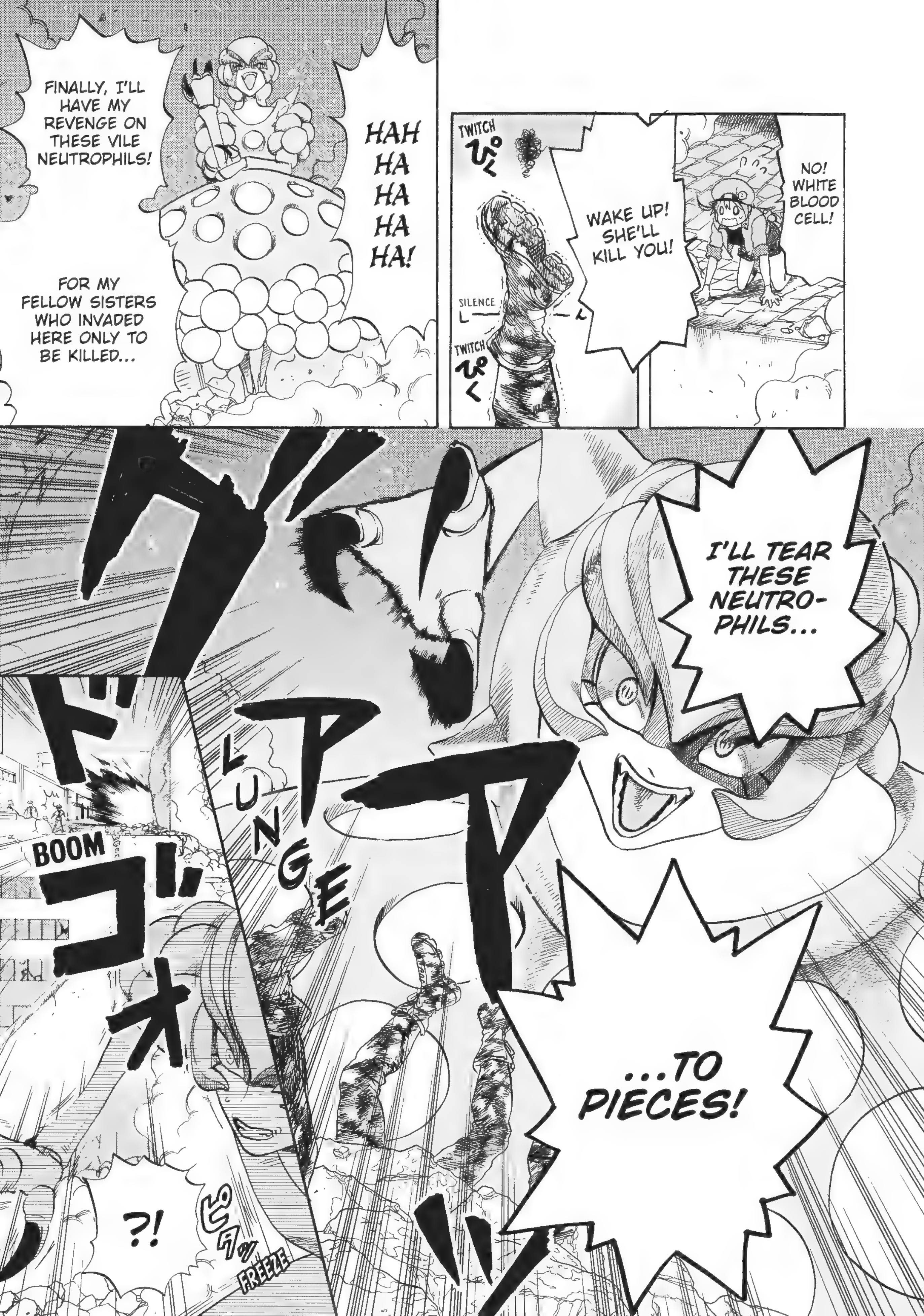
**Fibrin**
A protein involved in the coagulation of blood.

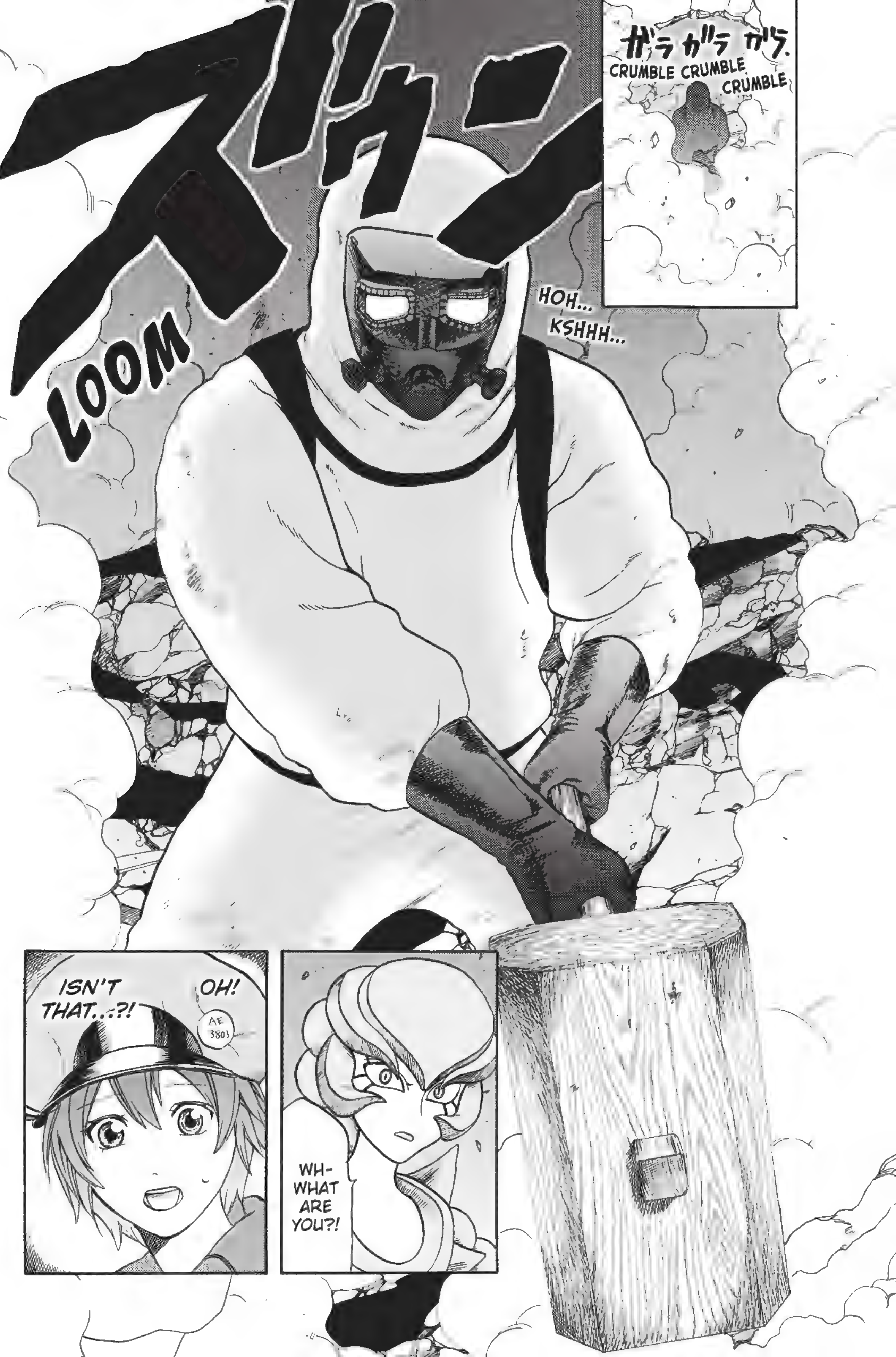

GAAUGH!
ZAP
バリ
ZAP
バリ
ZAP
バリ
ZAP
バリ
WH-WHAT HAPPENED...?
ぷす HISS
ぷす HISS
OH HO HO— SHALL I EXPLAIN?
UGH...
YOU SEE—
I'VE HEARD OF THIS...ONE OF THE TACTICS USED BY STAPHYLOCOCCUS AUREUS...
THEY USE FIBRIN TO DEFEND AGAINST ATTACKS...
I THINK THEY CALL THIS... COAGU—
I'M EXPLAINING HERE, NOT YOU!
AIEEE
AIEEE
AIEEE
ZAP ZAP ZAP ZAP
ばりばりばりばり
YES— COAGULASE!
RIGHT NOW MY ABILITIES FOR BOTH OFFENSE AND DEFENSE ARE THROUGH THE ROOF—
I'M INVINCIBLE!!

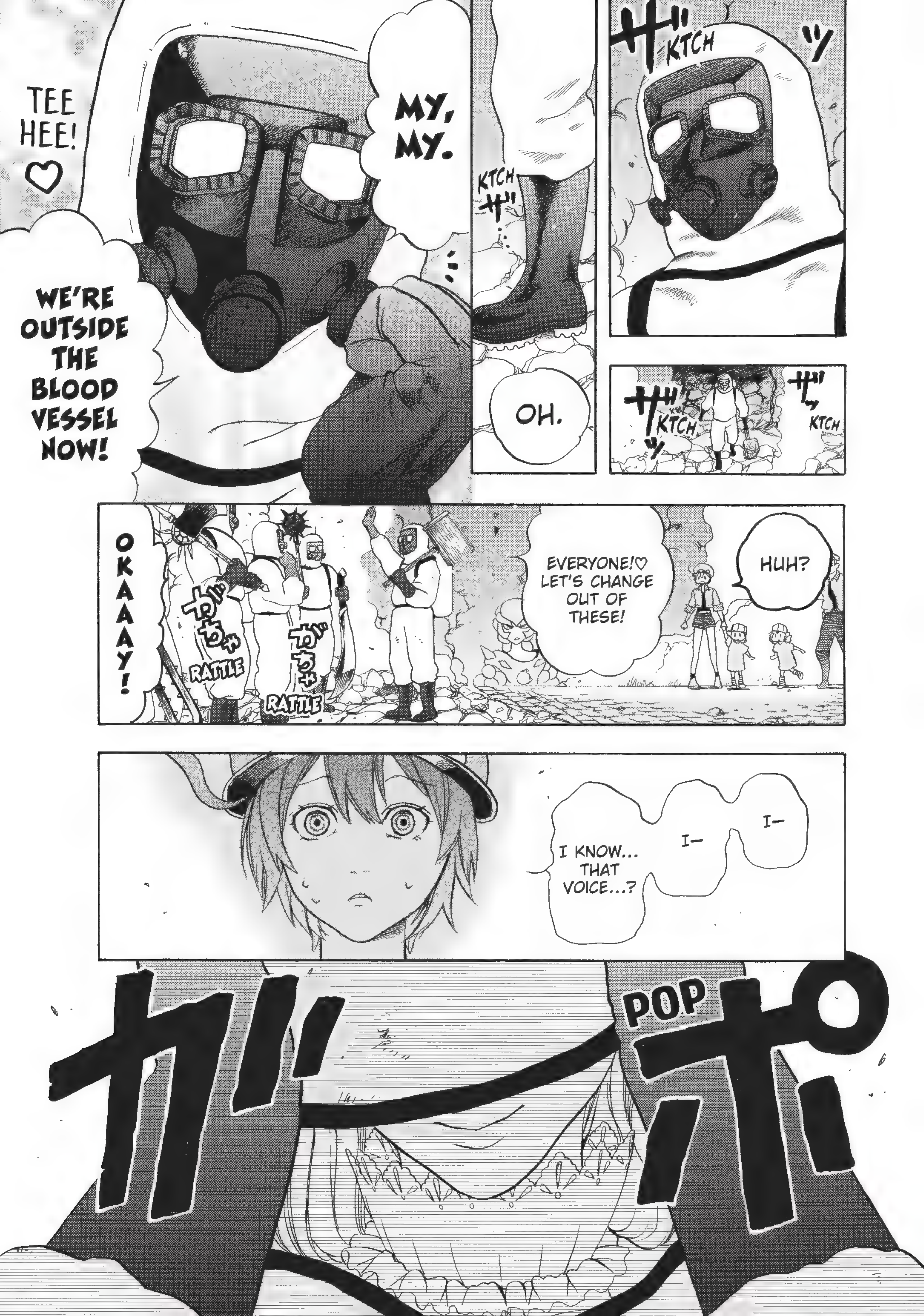
**Coagulase**
An enzyme that extracts fibrin to coagulate plasma. Bacteria that produce coagulase use nets made from fibrin to defend against attacks (phagocytosis) from white blood cells.

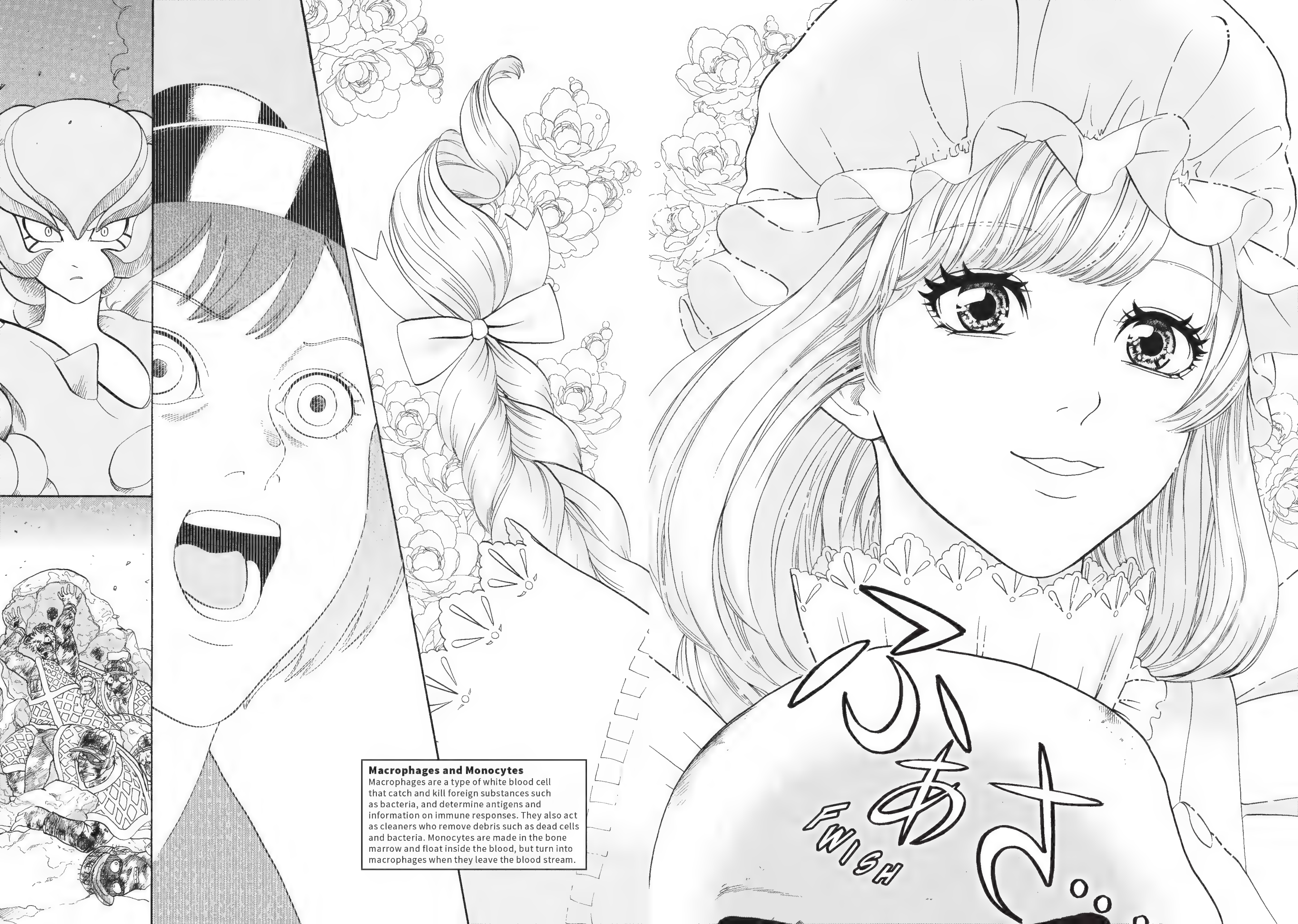

GAAAAAH!
NONE OF YOUR PUNY ATTACKS CAN TOUCH ME NOW!
AND WITH MY FIREPOWER...
...I'LL FINISH YOU ALL OFF!!
バゴォォン
KA-BOOM
GWAAAUGH!


RRRUMBLE
ドドドドド
ゴオオ
COUGH! COUGH!
ROOOARRR
オオオオ
WHAT HAPPENED TO THE WHITE BLOOD CELLS...?
AHHH HA HA HA HA!
しーん
SILENCE
MY, DOES THAT FEEL GOOD.
ヒュ
PEWWWWWWW
YOU CAN'T EVEN LAY A FINGER ON ME.
I SEE YOUR FEET, THOUGH! AH HA HA HA HA!


NO! WHITE BLOOD CELL!
WAKE UP! SHE'LL KILL YOU!
TWITCH
ぴく
SILENCE
TWITCH
ぴく
HAH HA HA HA HA!
FINALLY, I'LL HAVE MY REVENGE ON THESE VILE NEUTROPHILS!
FOR MY FELLOW SISTERS WHO INVADED HERE ONLY TO BE KILLED...
I'LL TEAR THESE NEUTROPHILS...
グワアーッ
LUNGE
...TO PIECES!
ドゴオ
BOOM
?!
ピタッ
FREEZE

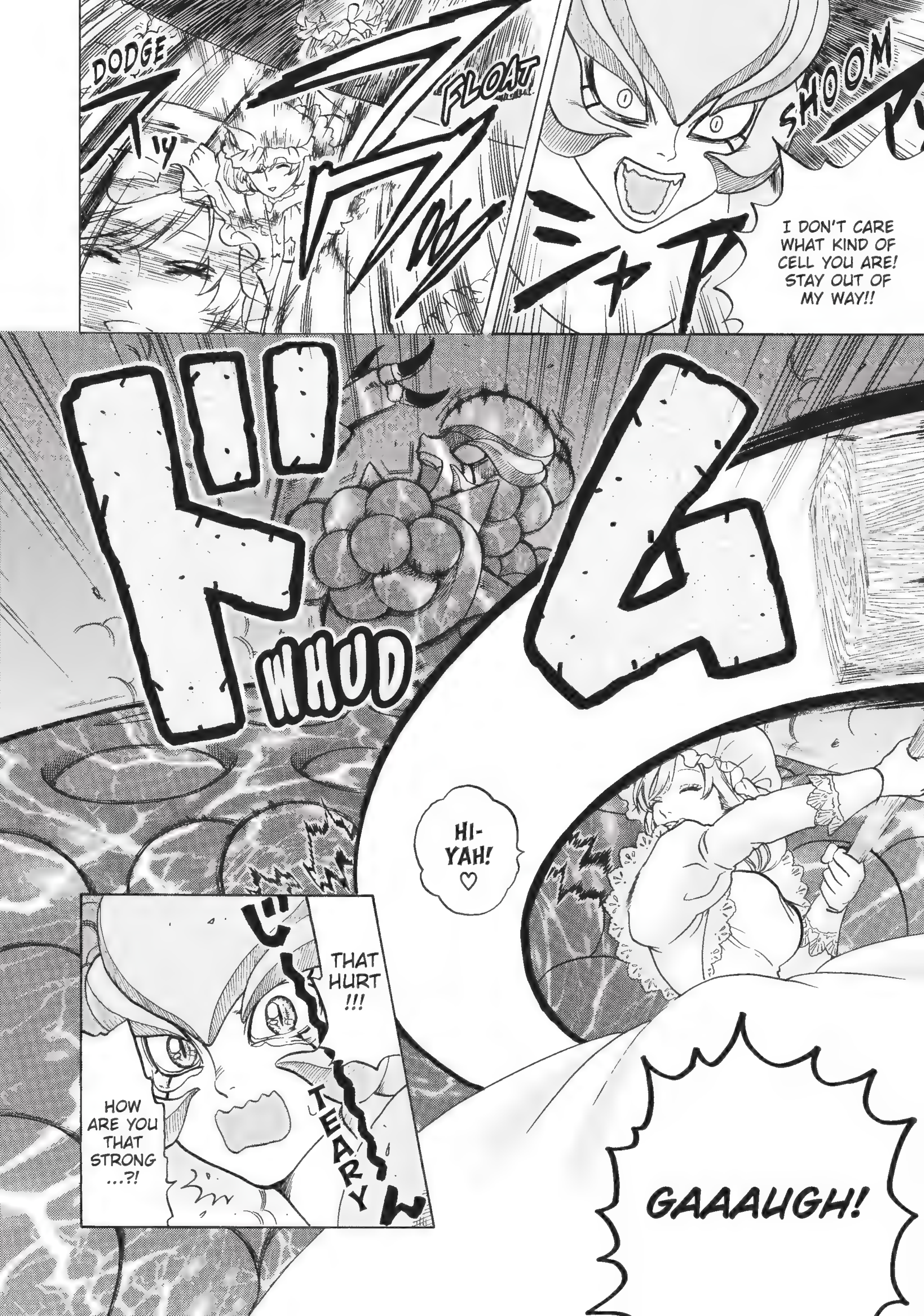

ガラガラガラ
CRUMBLE CRUMBLE CRUMBLE
ズゥン
LOOM
HOH... KSHHH...
WH- WHAT ARE YOU?!
OH!
ISN'T THAT...?!
AE 3803

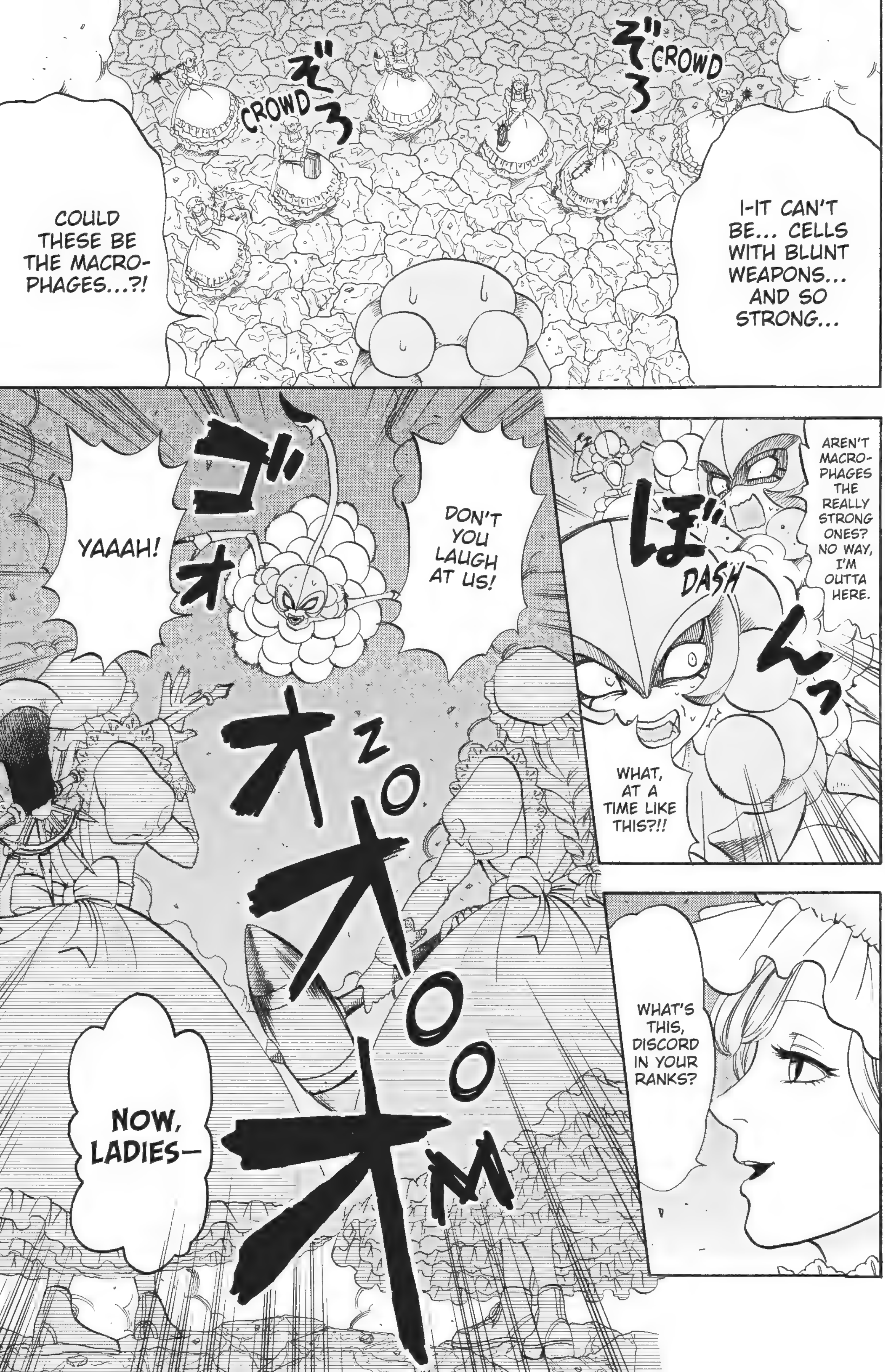

ザッ
KTCH
ッ
KTCH
ザッ
OH.
ザッ
KTCH
ザッ
KTCH
MY, MY.
TEE HEE! ♡
WE'RE OUTSIDE THE BLOOD VESSEL NOW!
HUH?
EVERYONE!♡ LET'S CHANGE OUT OF THESE!
OKAAAAY!
がちゃ
RATTLE
がちゃ
RATTLE
I—
I—
I KNOW... THAT VOICE...?
POP
ガッポ

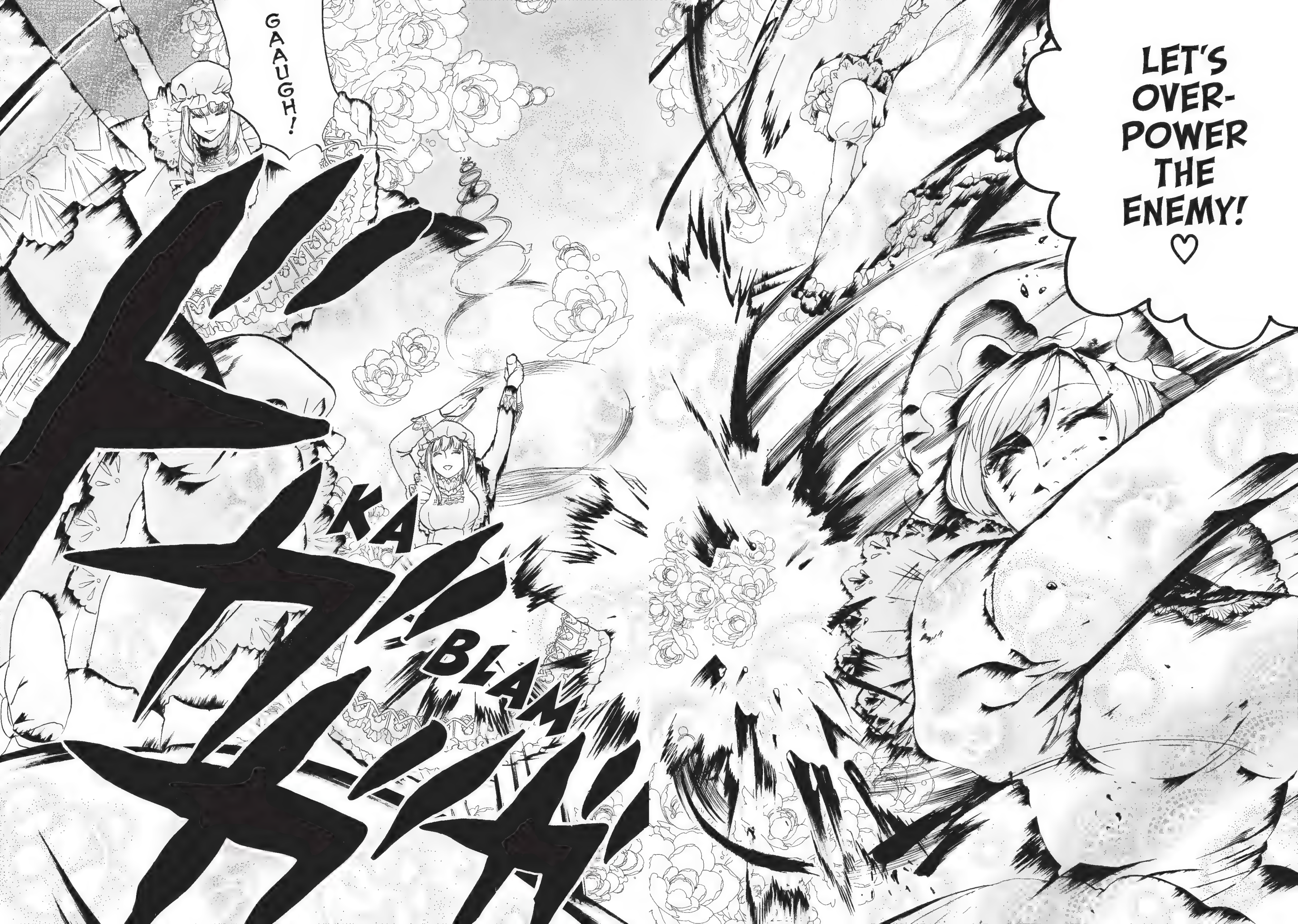


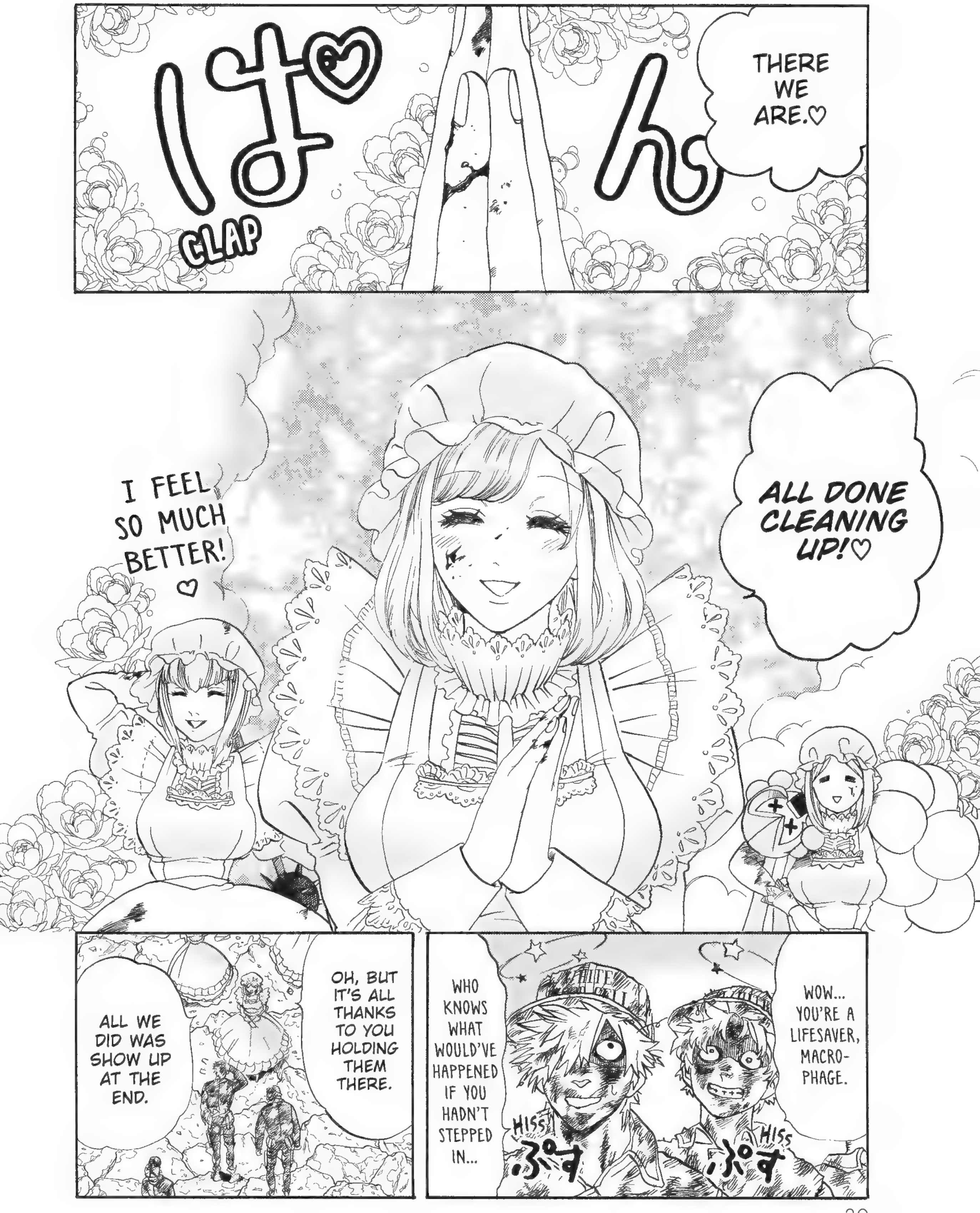
**Macrophages and Monocytes**

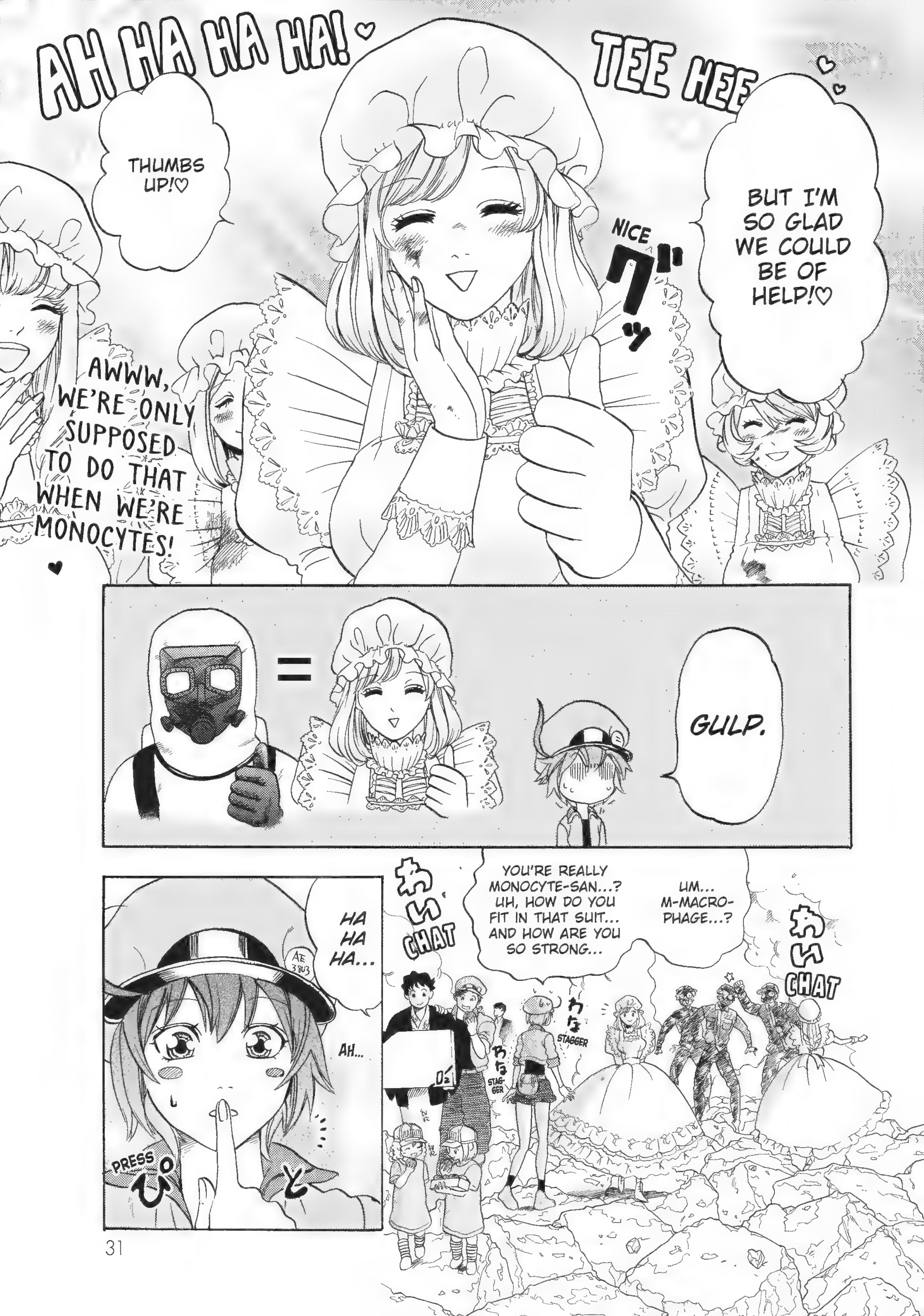
Macrophages are a type of white blood cell that catch and kill foreign substances such as bacteria, and determine antigens and information on immune responses. They also act as cleaners who remove debris such as dead cells and bacteria. Monocytes are made in the bone marrow and float inside the blood, but turn into macrophages when they leave the blood stream.

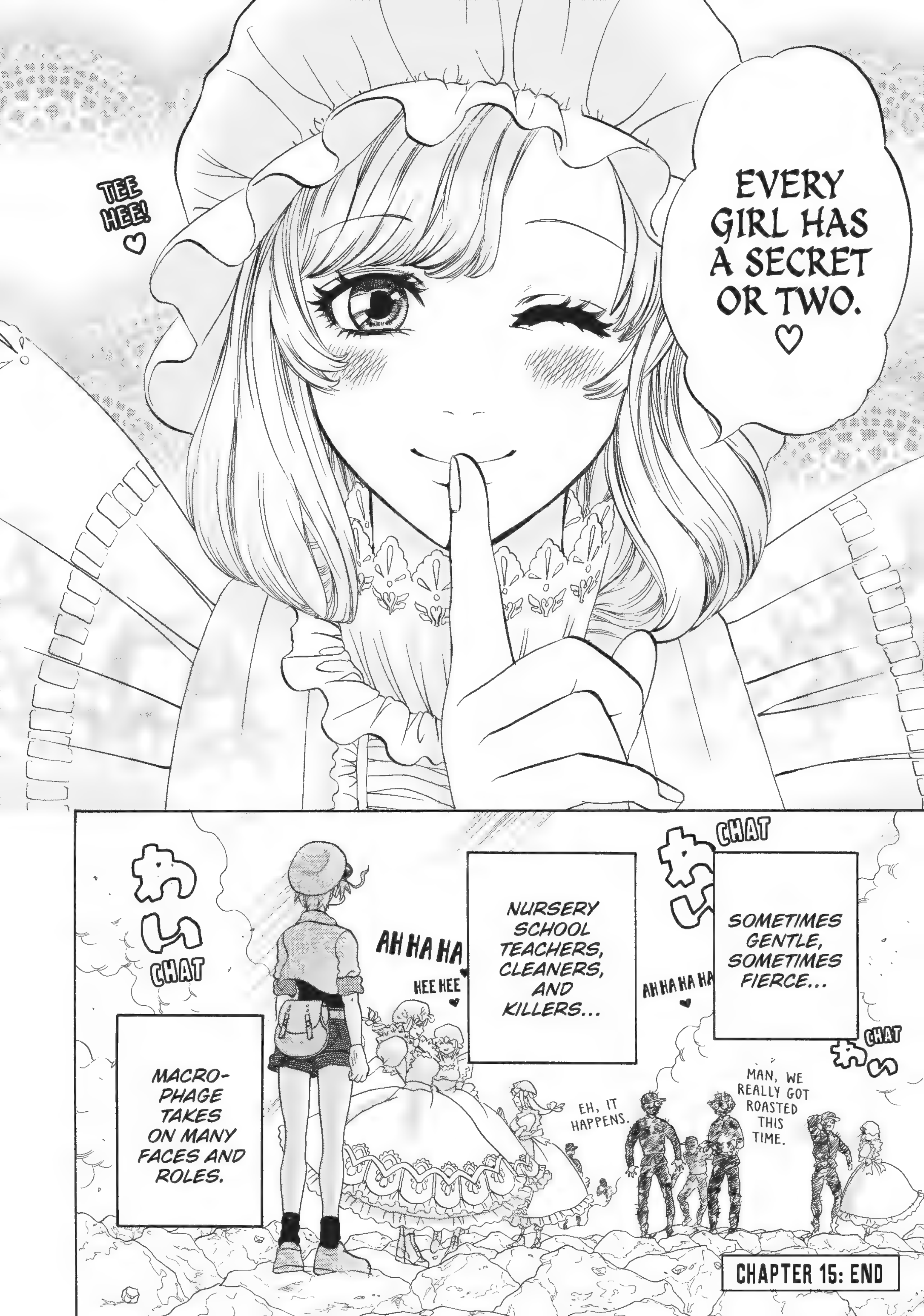

SHOOM
I DON'T CARE WHAT KIND OF CELL YOU ARE! STAY OUT OF MY WAY!!
FLOAT
DODGE
ドム
WHUD
HI-YAH! ♡
GAAAUGH!
THAT HURT!!!
TEARY
HOW ARE YOU THAT STRONG...?!


ぞろ CROWD
ぞろ CROWD
I-IT CAN'T BE... CELLS WITH BLUNT WEAPONS... AND SO STRONG...
COULD THESE BE THE MACROPHAGES...?!
AREN'T MACROPHAGES THE REALLY STRONG ONES? NO WAY, I'M OUTTA HERE.
ぼーんっ DASH
WHAT, AT A TIME LIKE THIS?!!
WHAT'S THIS, DISCORD IN YOUR RANKS?
DON'T YOU LAUGH AT US!
YAAAH!
ゴオオオオオ ZOOOOM
NOW, LADIES—


LET'S OVER-POWER THE ENEMY! ♡
KA
BLAM
GAAUGH!


THERE WE ARE.♡
ぱん
CLAP
ALL DONE CLEANING UP!♡
I FEEL SO MUCH BETTER! ♡
WOW... YOU'RE A LIFESAVER, MACROPHAGE.
WHO KNOWS WHAT WOULD'VE HAPPENED IF YOU HADN'T STEPPED IN...
HISS ぷす
HISS ぷす
OH, BUT IT'S ALL THANKS TO YOU HOLDING THEM THERE.
ALL WE DID WAS SHOW UP AT THE END.

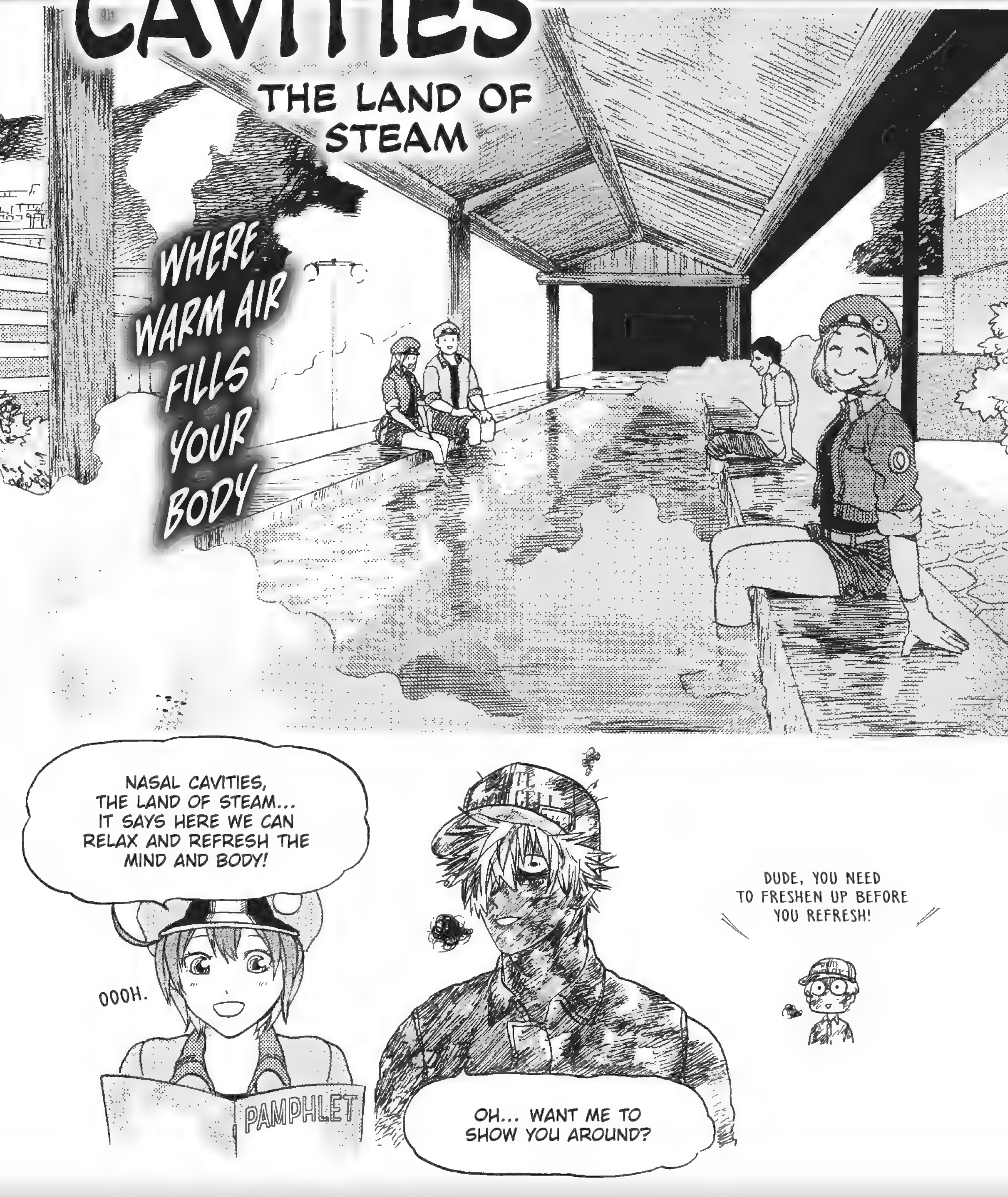

TEE HEE
BUT I'M SO GLAD WE COULD BE OF HELP!♡
NICE グッ
AH HA HA HA!♡
THUMBS UP!♡
AWWW, WE'RE ONLY SUPPOSED TO DO THAT WHEN WE'RE MONOCYTES!
GULP.
わい CHAT
UM... M-MACRO-PHAGE...?
YOU'RE REALLY MONOCYTE-SAN...? UH, HOW DO YOU FIT IN THAT SUIT... AND HOW ARE YOU SO STRONG...
わい CHAT
わな STAGGER
わな STAGGER
O2
HA HA HA...
AE 3803
AH...
PRESS ぴと


EVERY GIRL HAS A SECRET OR TWO. ♡
TEE HEE! ♡
わい CHAT
わい CHAT
SOMETIMES GENTLE, SOMETIMES FIERCE...
AH HA HA HA
NURSERY SCHOOL TEACHERS, CLEANERS, AND KILLERS...
AH HA HA
HEE HEE ♡
わい CHAT
MAN, WE REALLY GOT ROASTED THIS TIME.
EH, IT HAPPENS.
MACROPHAGE TAKES ON MANY FACES AND ROLES.
CHAPTER 15: END

# NASAL CAVITIES

## THE LAND OF STEAM

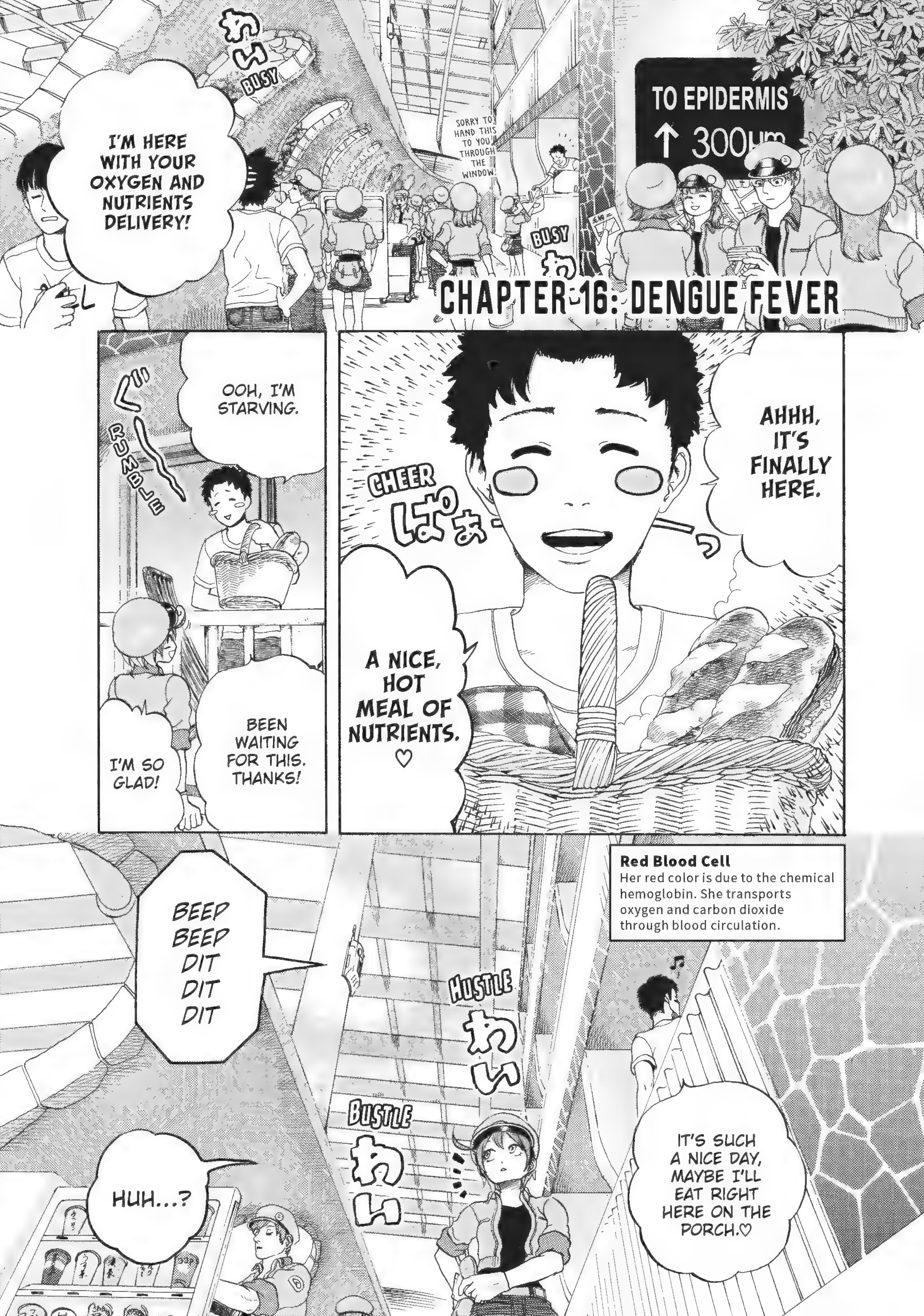
Nasal cavities are the entrance of the respiratory system. They warm and moisten the air entering the body in order to protect the delicate alveoli from damage.


WHERE WARM AIR FILLS YOUR BODY
NASAL CAVITIES, THE LAND OF STEAM... IT SAYS HERE WE CAN RELAX AND REFRESH THE MIND AND BODY!
OOOH.
PAMPHLET
OH... WANT ME TO SHOW YOU AROUND?
DUDE, YOU NEED TO FRESHEN UP BEFORE YOU REFRESH!

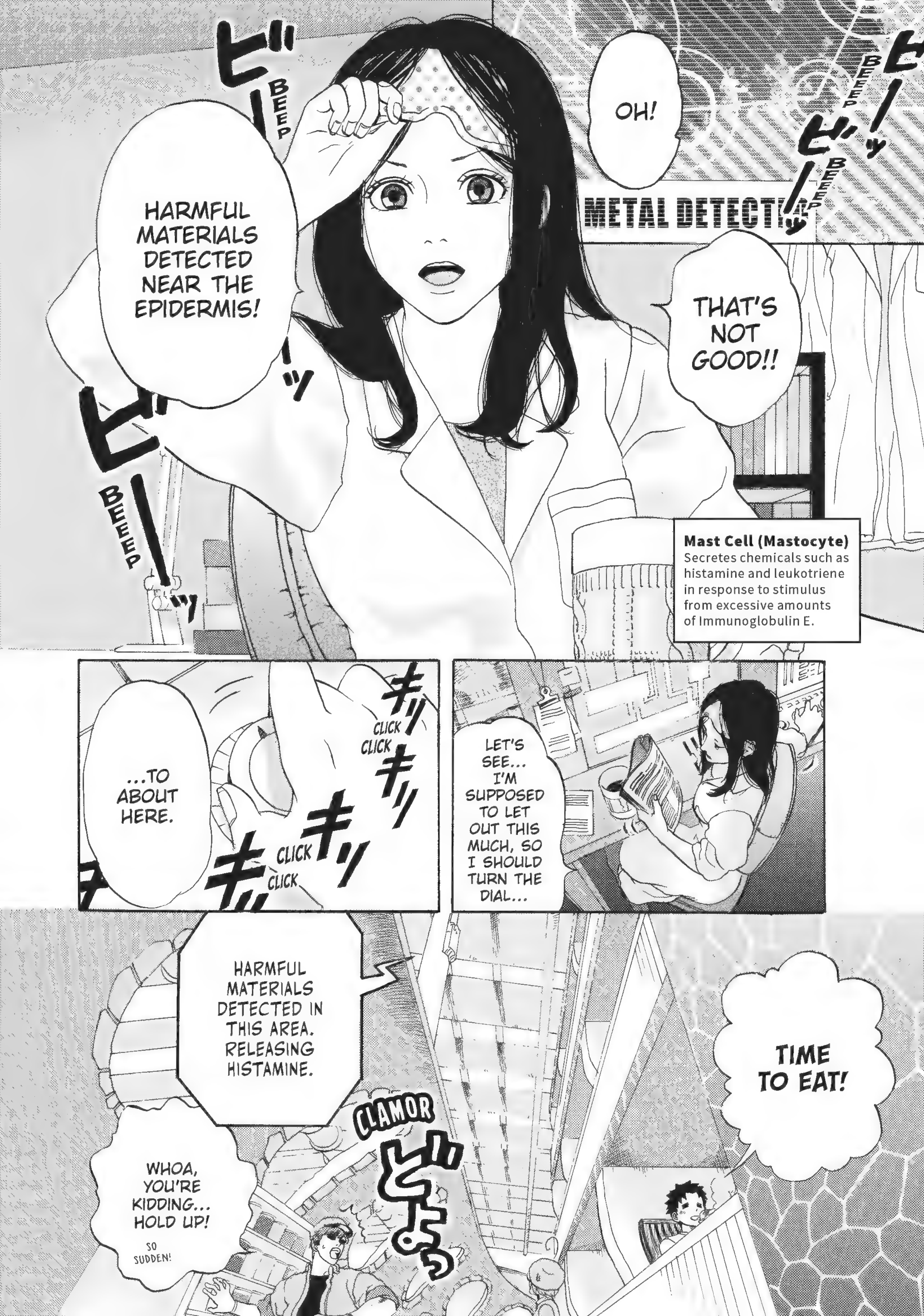
Cells at Work!

はたらく細胞

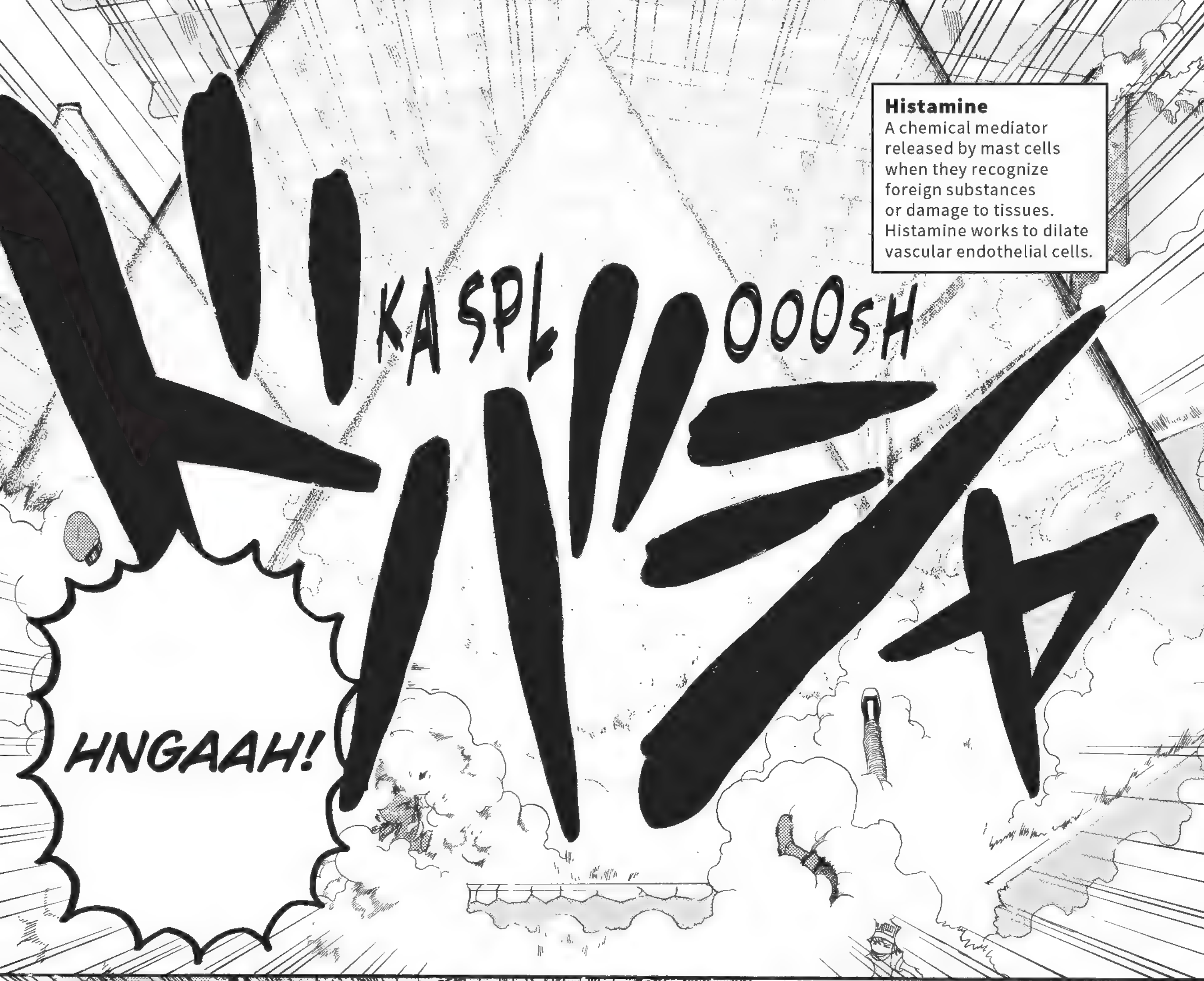
# CHAPTER 16: DENGUE FEVER


TO EPIDERMIS
↑ 300µm
BUSY
わ
SORRY TO HAND THIS TO YOU THROUGH THE WINDOW.
わい
BUSY
I'M HERE WITH YOUR OXYGEN AND NUTRIENTS DELIVERY!
AHHH, IT'S FINALLY HERE.
CHEER
ぱぁーーっ
A NICE, HOT MEAL OF NUTRIENTS. ♡
OOH, I'M STARVING.
ぐぃ～～
RUMBLE
BEEN WAITING FOR THIS. THANKS!
I'M SO GLAD!
IT'S SUCH A NICE DAY, MAYBE I'LL EAT RIGHT HERE ON THE PORCH.♡
HUSTLE
わい
BUSTLE
わい
BEEP BEEP DIT DIT DIT
HUH...?

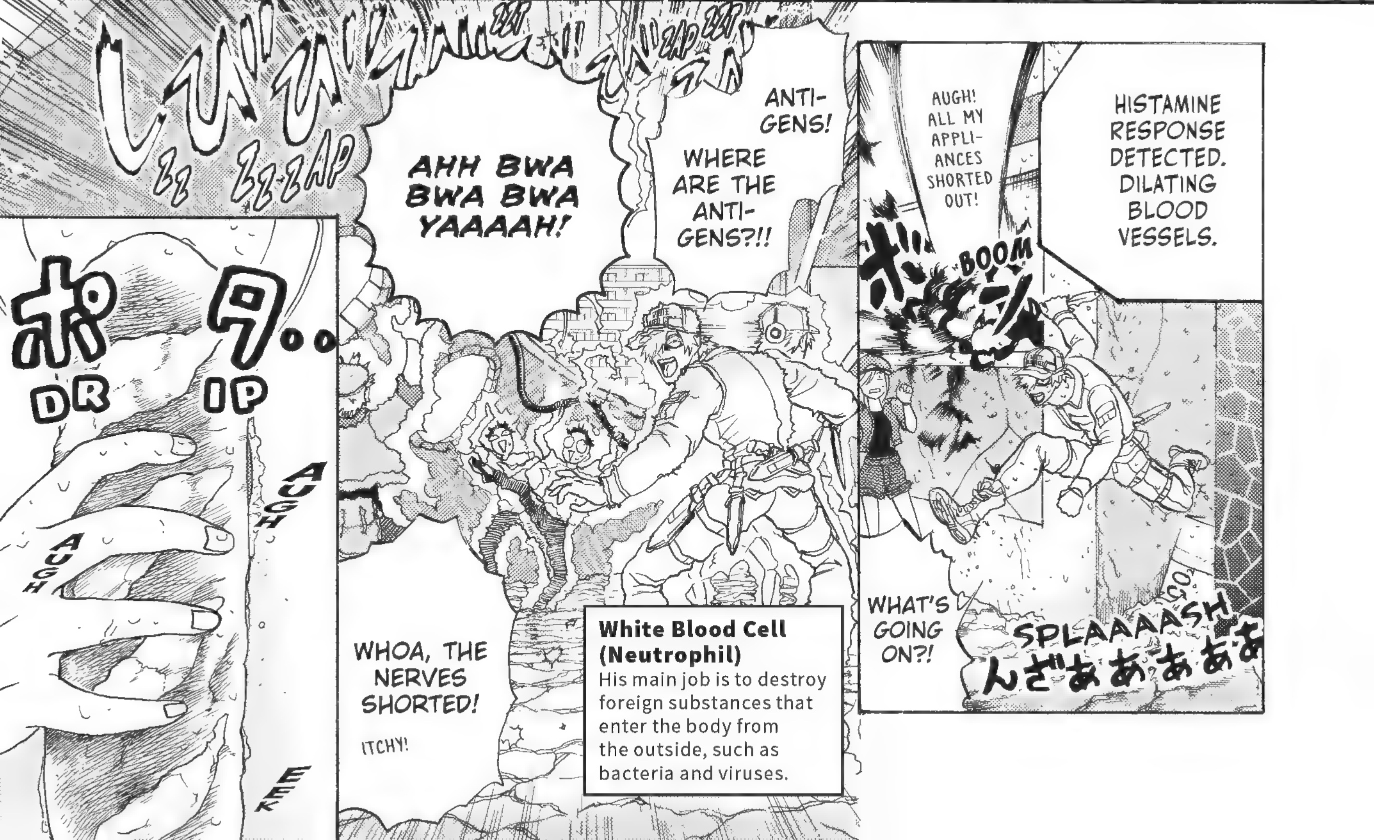
**Red Blood Cell**
Her red color is due to the chemical hemoglobin. She transports oxygen and carbon dioxide through blood circulation.


BEEEP
BEEEP
OH!
METAL DETECTI
THAT'S NOT GOOD!!
BEEEP
HARMFUL MATERIALS DETECTED NEAR THE EPIDERMIS!
BEEEP
LET'S SEE... I'M SUPPOSED TO LET OUT THIS MUCH, SO I SHOULD TURN THE DIAL...
CLICK
CLICK
CLICK
CLICK
...TO ABOUT HERE.
TIME TO EAT!
HARMFUL MATERIALS DETECTED IN THIS AREA. RELEASING HISTAMINE.
CLAMOR
WHOA, YOU'RE KIDDING... HOLD UP!
SO SUDDEN!

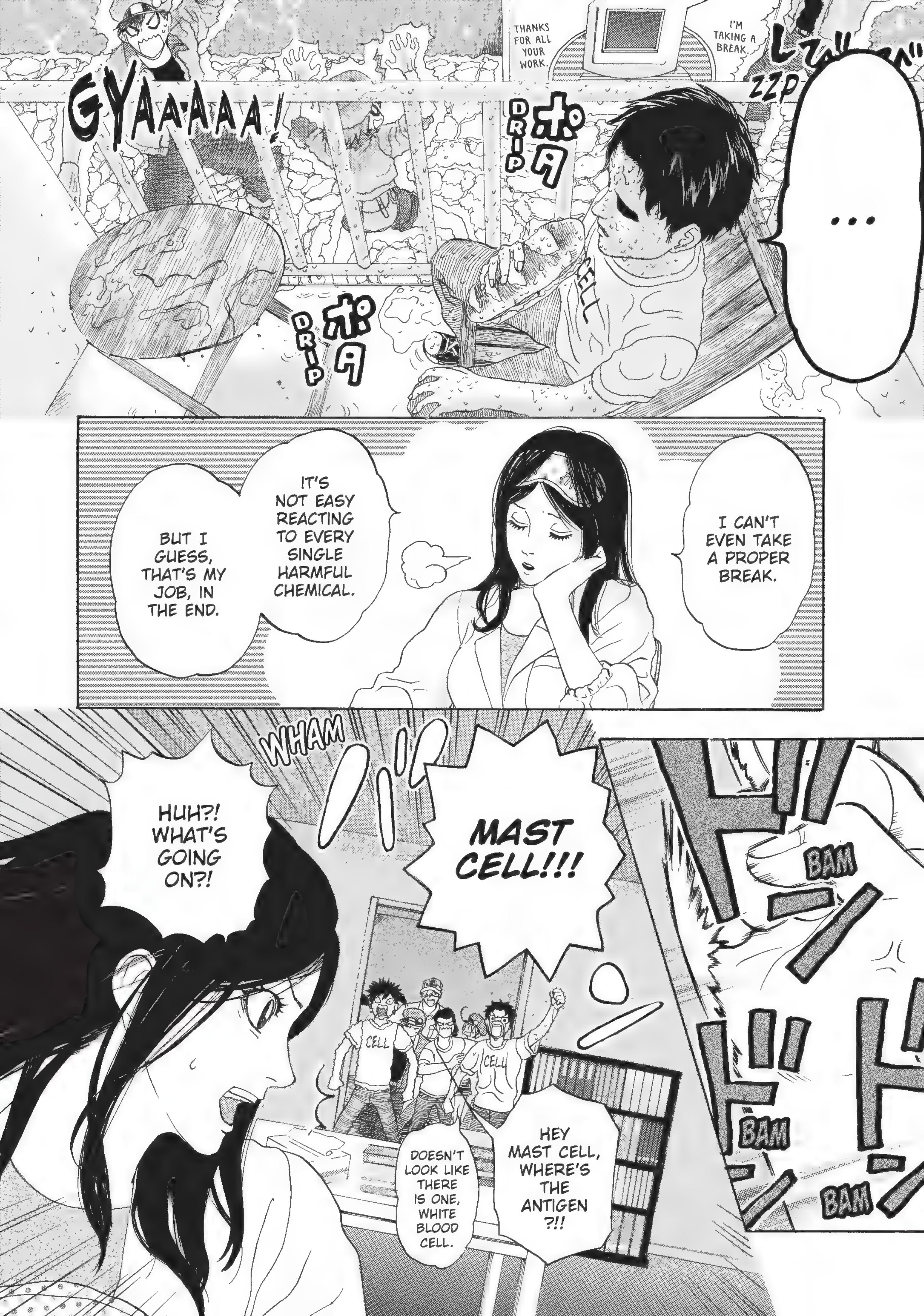
**Mast Cell (Mastocyte)**
Secretes chemicals such as histamine and leukotriene in response to stimulus from excessive amounts of Immunoglobulin E.

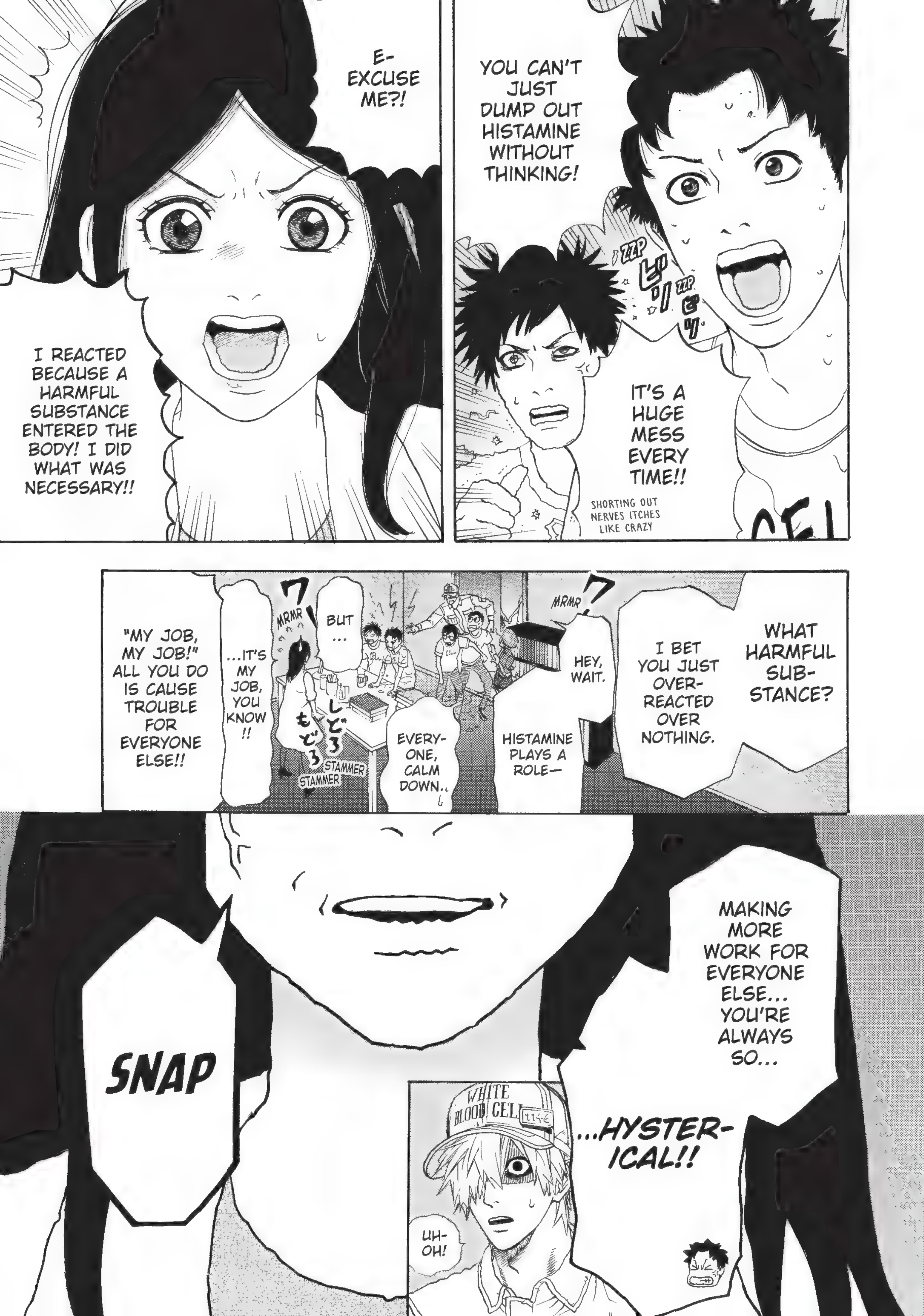

ドバシャ
KA SPLOOOSH
HNGAAH!

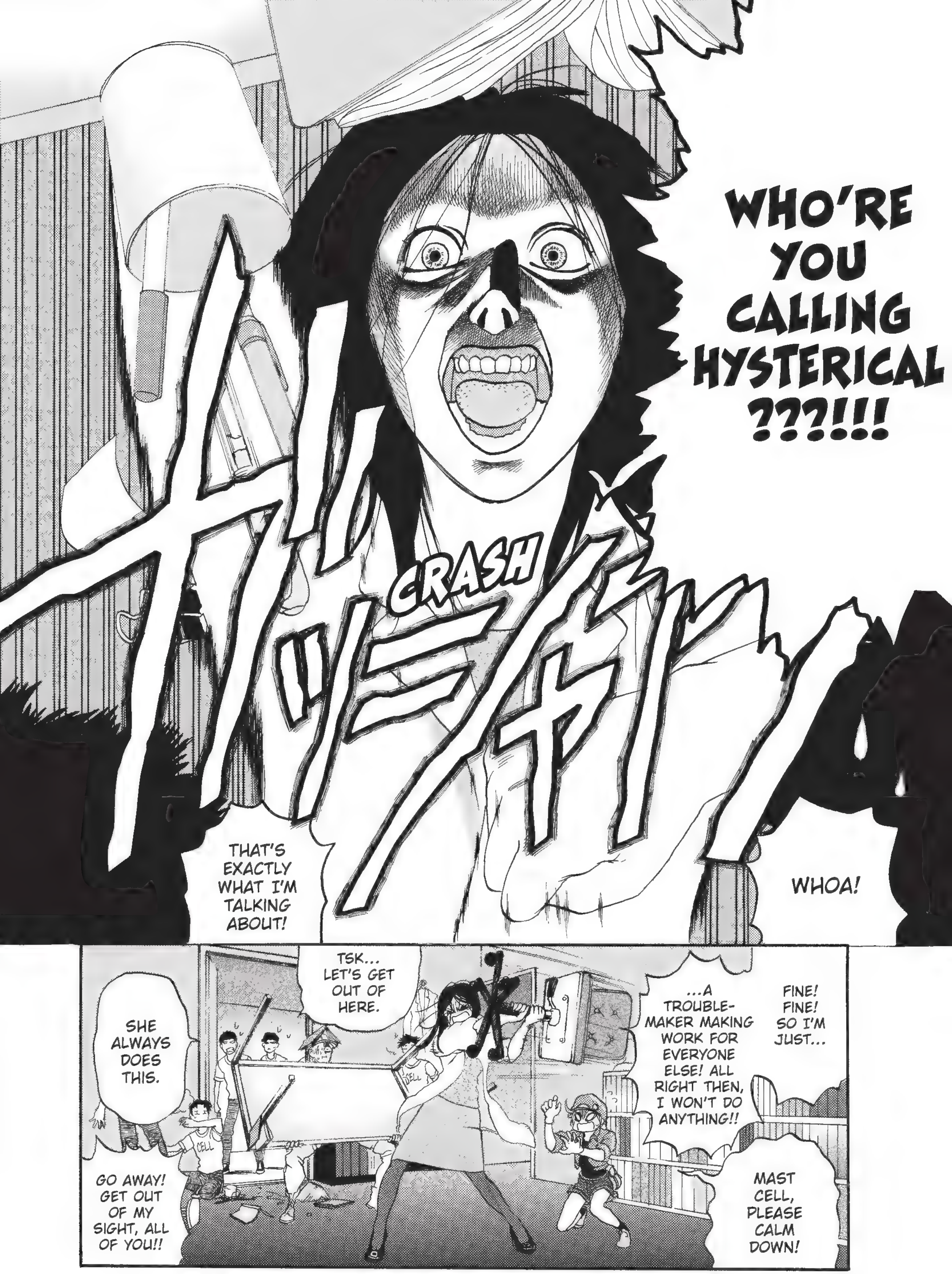
**Histamine**
A chemical mediator released by mast cells when they recognize foreign substances or damage to tissues. Histamine works to dilate vascular endothelial cells.

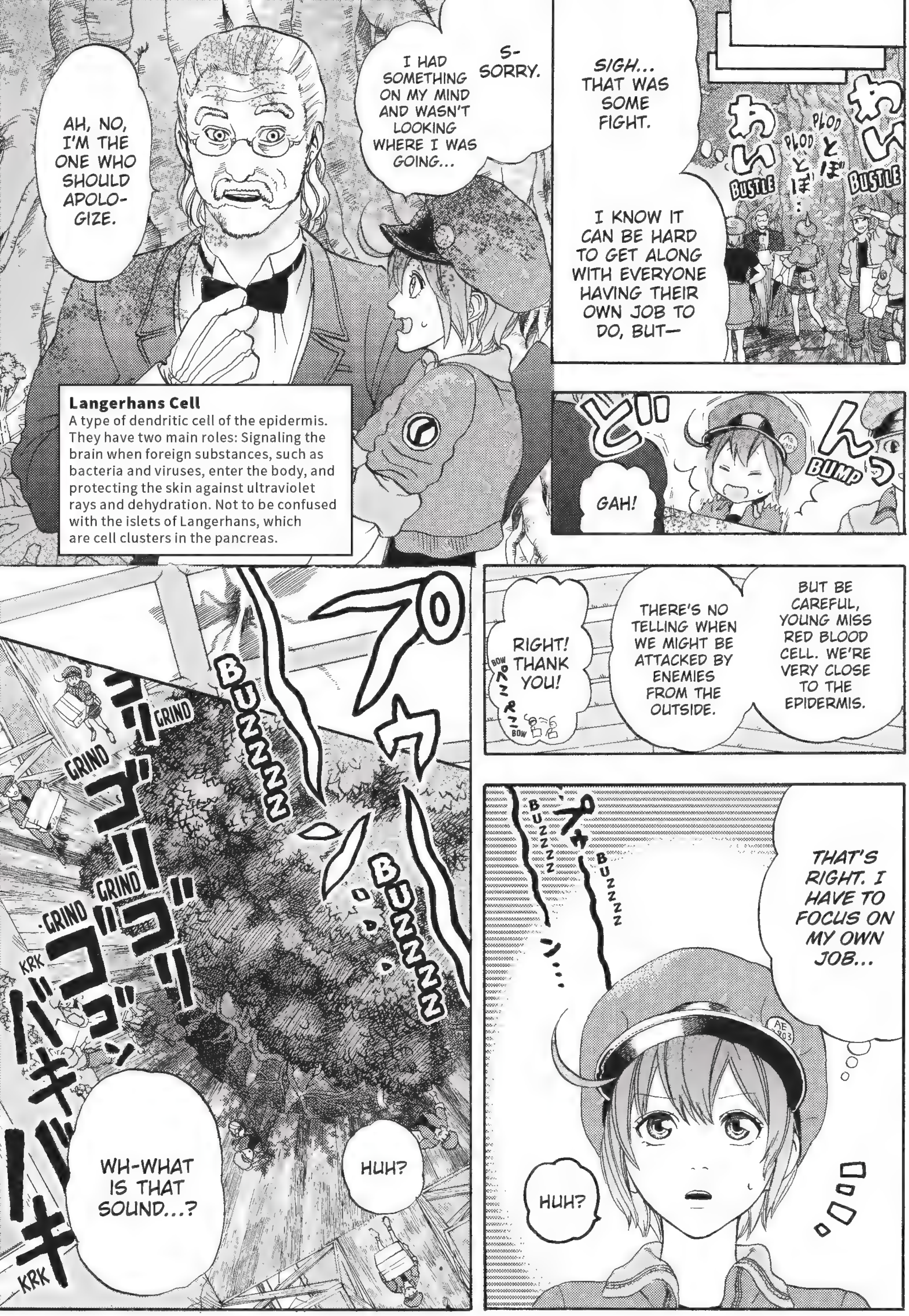

HISTAMINE RESPONSE DETECTED. DILATING BLOOD VESSELS.
AUGH! ALL MY APPLIANCES SHORTED OUT!
ボン
BOOM
WHAT'S GOING ON?!
んざあああああ
SPLAAAASH
ANTI-GENS!
WHERE ARE THE ANTI-GENS?!!
AHH BWA BWA BWA YAAAAH!
しびびびび
ZZ ZZ-ZAP
WHOA, THE NERVES SHORTED!
ITCHY!
ポタ..
DRIP
AUGH
AUGH
EEK

**White Blood Cell (Neutrophil)**
His main job is to destroy foreign substances that enter the body from the outside, such as bacteria and viruses.


I'M TAKING A BREAK.
THANKS FOR ALL YOUR WORK.
ZZP
...
DRIP ポタ
DRIP ポタ
GYAAAAA!
I CAN'T EVEN TAKE A PROPER BREAK.
IT'S NOT EASY REACTING TO EVERY SINGLE HARMFUL CHEMICAL.
BUT I GUESS, THAT'S MY JOB, IN THE END.
BAM ドン
BAM ドン
BAM ドン
BAM
WHAM
MAST CELL!!!
HUH?! WHAT'S GOING ON?!
HEY MAST CELL, WHERE'S THE ANTIGEN?!!
DOESN'T LOOK LIKE THERE IS ONE, WHITE BLOOD CELL.

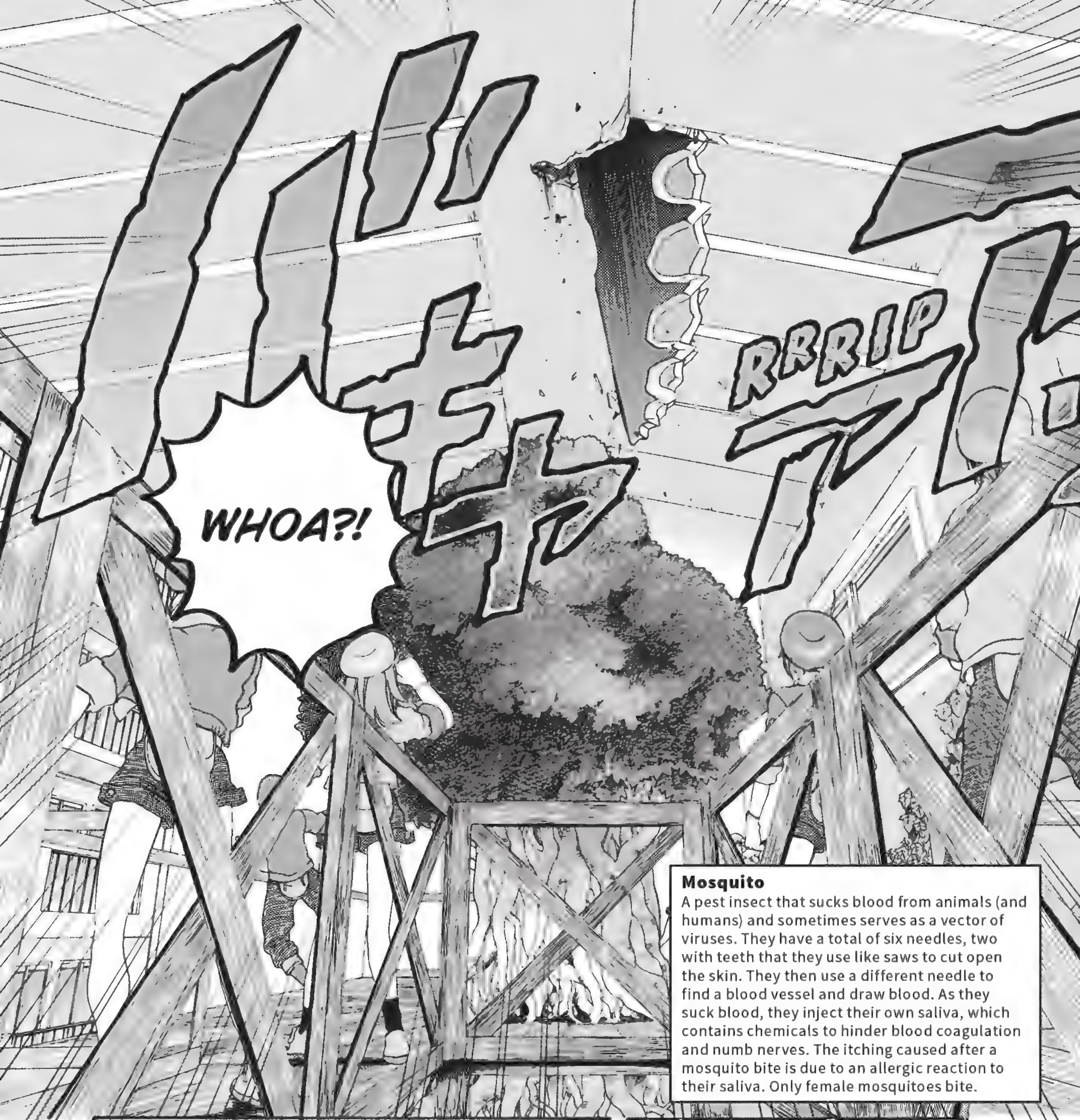

YOU CAN'T JUST DUMP OUT HISTAMINE WITHOUT THINKING!
ZZP ビリッ
ZZP ビリッ
IT'S A HUGE MESS EVERY TIME!!
SHORTING OUT NERVES ITCHES LIKE CRAZY
E-EXCUSE ME?!
I REACTED BECAUSE A HARMFUL SUBSTANCE ENTERED THE BODY! I DID WHAT WAS NECESSARY!!
WHAT HARMFUL SUBSTANCE?
I BET YOU JUST OVERREACTED OVER NOTHING.
MRMR
HEY, WAIT.
HISTAMINE PLAYS A ROLE—
EVERYONE, CALM DOWN..
BUT...
MRMR
...IT'S MY JOB, YOU KNOW!!
しどろ STAMMER
もどろ STAMMER
"MY JOB, MY JOB!" ALL YOU DO IS CAUSE TROUBLE FOR EVERYONE ELSE!!
MAKING MORE WORK FOR EVERYONE ELSE... YOU'RE ALWAYS SO...
...HYSTERICAL!!
SNAP
WHITE BLOOD CELL 1146
UH-OH!


WHO'RE YOU CALLING HYSTERICAL???!!!
CRASH
WHOA!
THAT'S EXACTLY WHAT I'M TALKING ABOUT!
FINE! FINE! SO I'M JUST...
...A TROUBLE-MAKER MAKING WORK FOR EVERYONE ELSE! ALL RIGHT THEN, I WON'T DO ANYTHING!!
TSK... LET'S GET OUT OF HERE.
SHE ALWAYS DOES THIS.
CELL
CELL
MAST CELL, PLEASE CALM DOWN!
GO AWAY! GET OUT OF MY SIGHT, ALL OF YOU!!

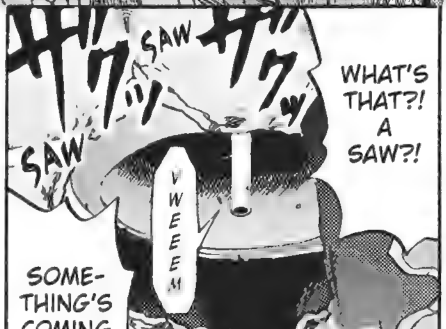


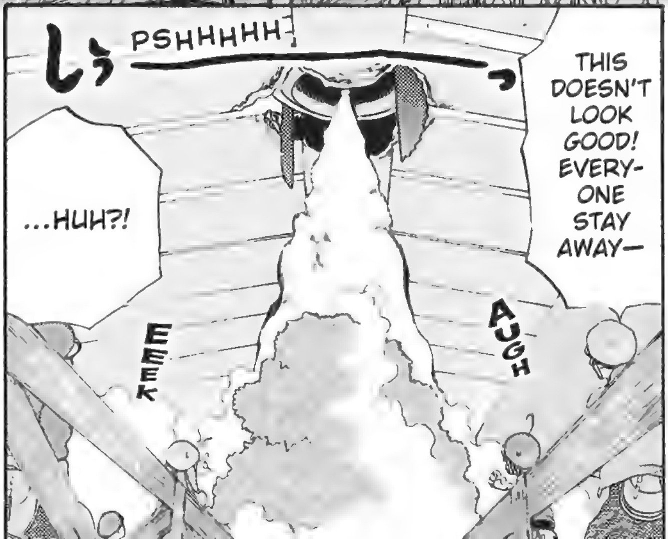
**Langerhans Cell**
A type of dendritic cell of the epidermis. They have two main roles: Signaling the brain when foreign substances, such as bacteria and viruses, enter the body, and protecting the skin against ultraviolet rays and dehydration. Not to be confused with the islets of Langerhans, which are cell clusters in the pancreas.

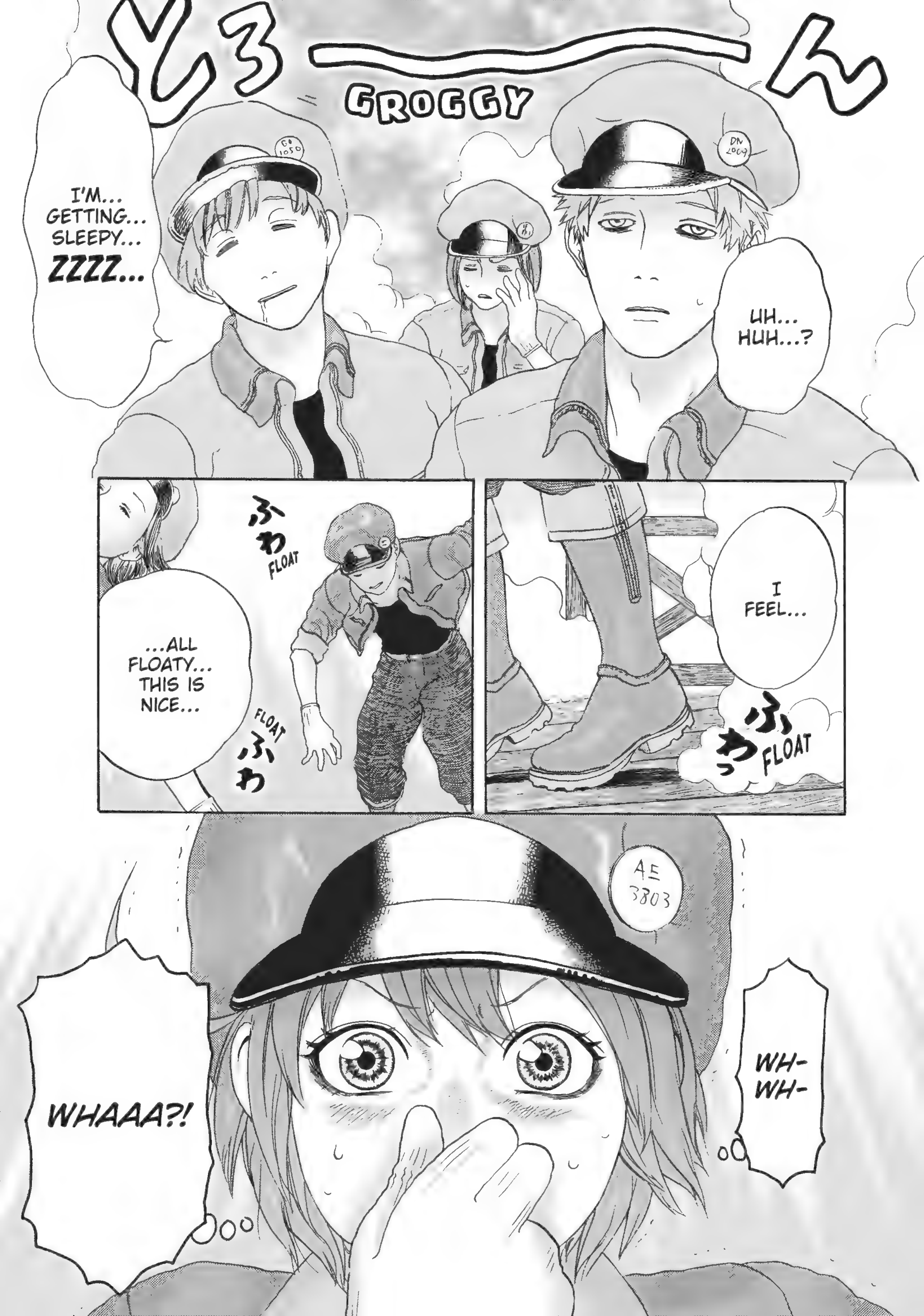
SIGH... THAT WAS SOME FIGHT.
わいわい BUSTLE
とぼとぼ PLOD PLOD
わいわい BUSTLE
I KNOW IT CAN BE HARD TO GET ALONG WITH EVERYONE HAVING THEIR OWN JOB TO DO, BUT—
どんっ BUMP
GAH!
S-SORRY.
I HAD SOMETHING ON MY MIND AND WASN'T LOOKING WHERE I WAS GOING...
AH, NO, I'M THE ONE WHO SHOULD APOLOGIZE.
BUT BE CAREFUL, YOUNG MISS RED BLOOD CELL. WE'RE VERY CLOSE TO THE EPIDERMIS.
THERE'S NO TELLING WHEN WE MIGHT BE ATTACKED BY ENEMIES FROM THE OUTSIDE.
RIGHT! THANK YOU!
BOW BOW
プゥーン BUZZZZ BUZZZZ
THAT'S RIGHT. I HAVE TO FOCUS ON MY OWN JOB...
HUH?
プゥーン BUZZZZZ BUZZZZZ
ゴリゴリ GRIND GRIND GRIND GRIND
バキバキ KRK KRK
HUH?
WH-WHAT IS THAT SOUND...?

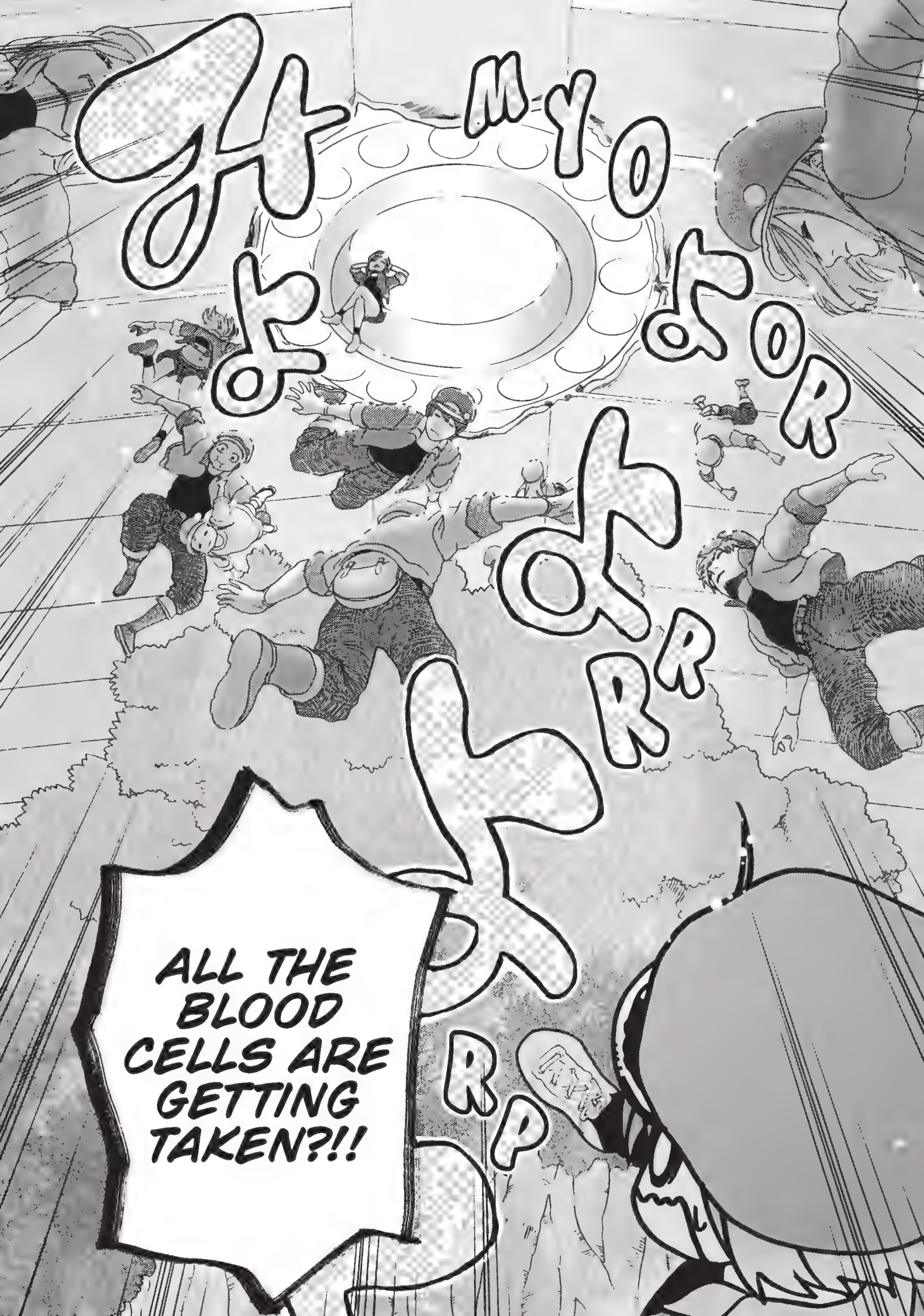


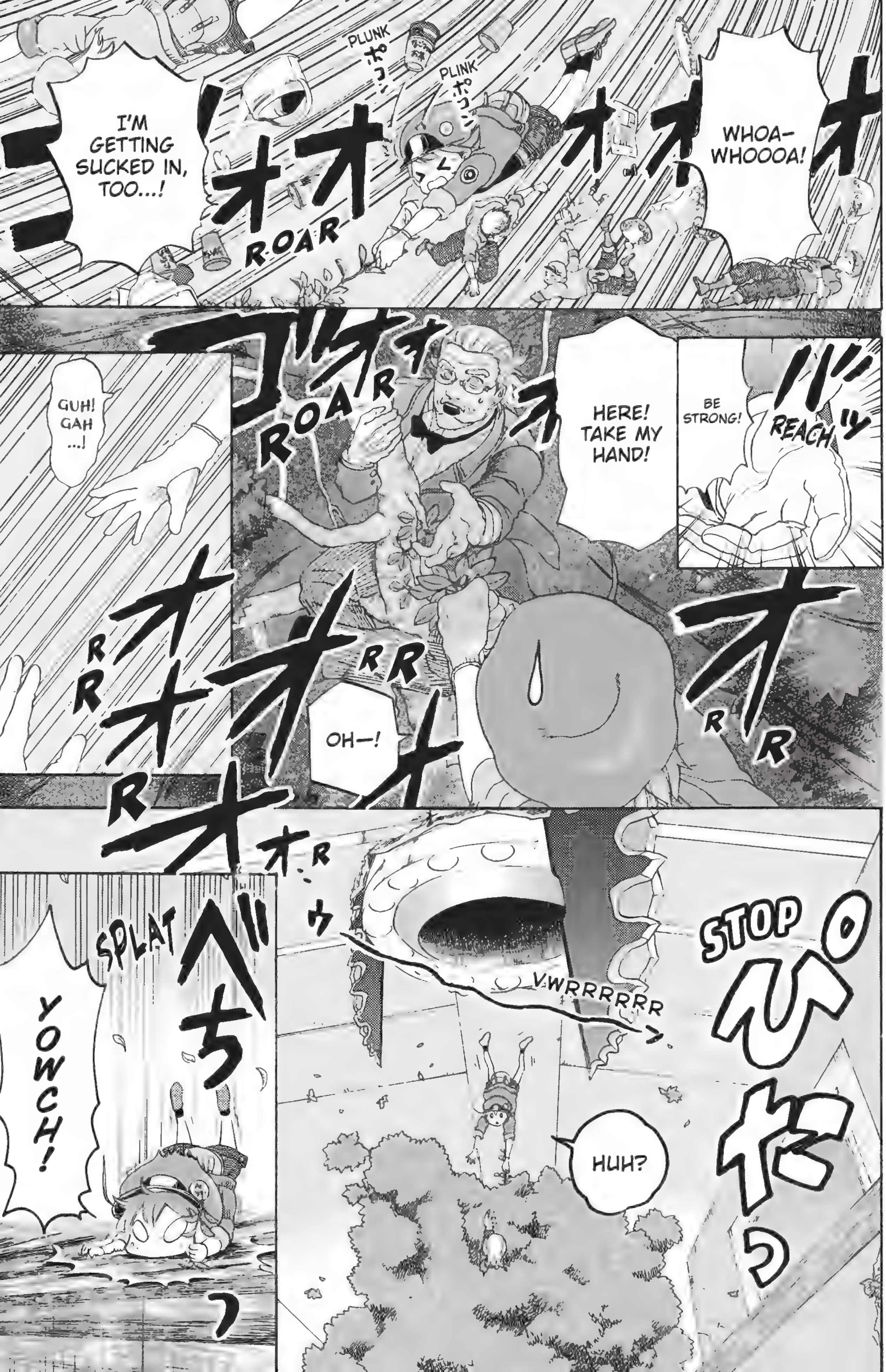
**Mosquito**
A pest insect that sucks blood from animals (and humans) and sometimes serves as a vector of viruses. They have a total of six needles, two with teeth that they use like saws to cut open the skin. They then use a different needle to find a blood vessel and draw blood. As they suck blood, they inject their own saliva, which contains chemicals to hinder blood coagulation and numb nerves. The itching caused after a mosquito bite is due to an allergic reaction to their saliva. Only female mosquitoes bite.

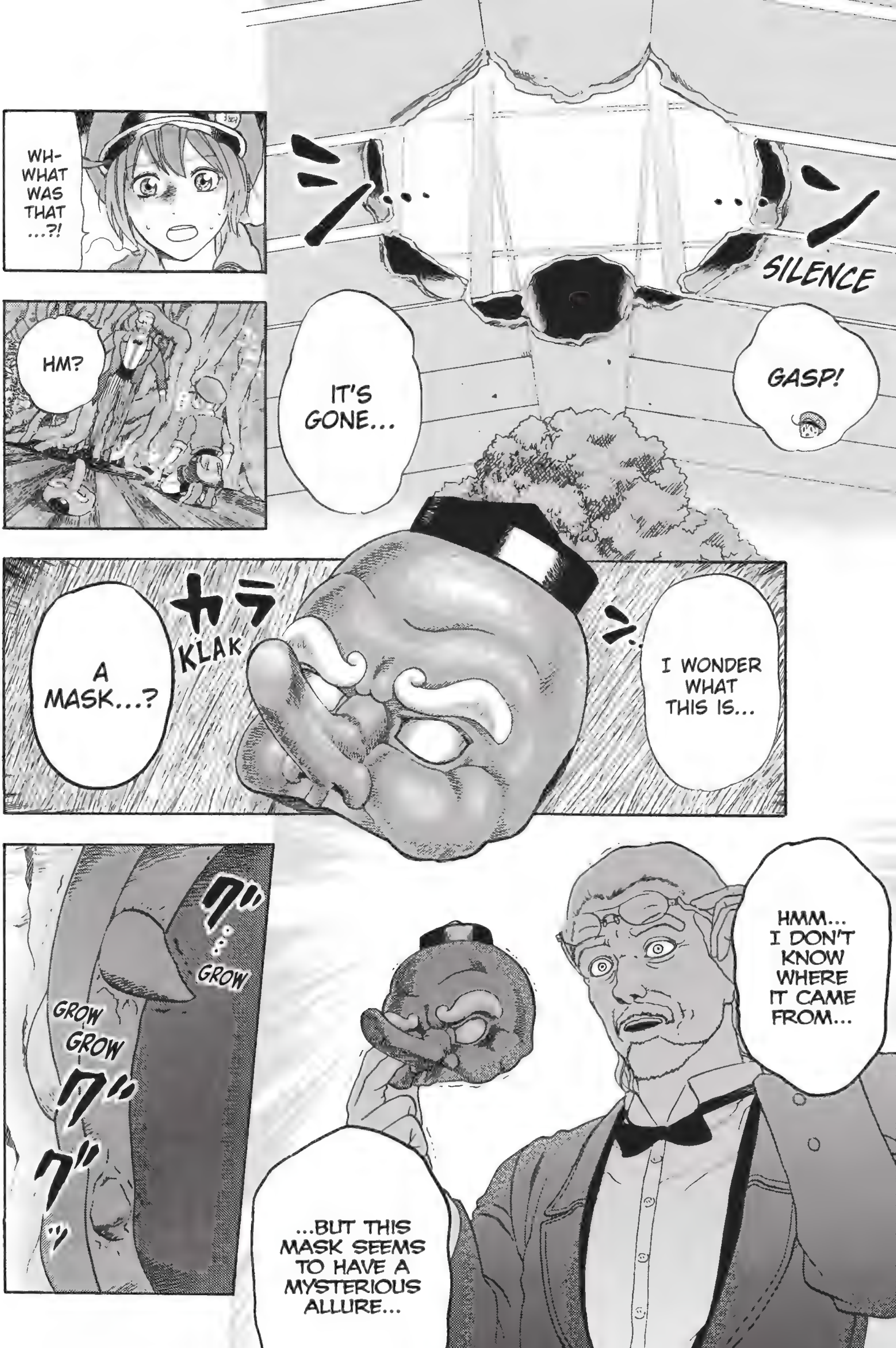

SAW
WHAT'S THAT?! A SAW?!
SAW
VWEEEM
SOMETHING'S COMING OUT!
SAW

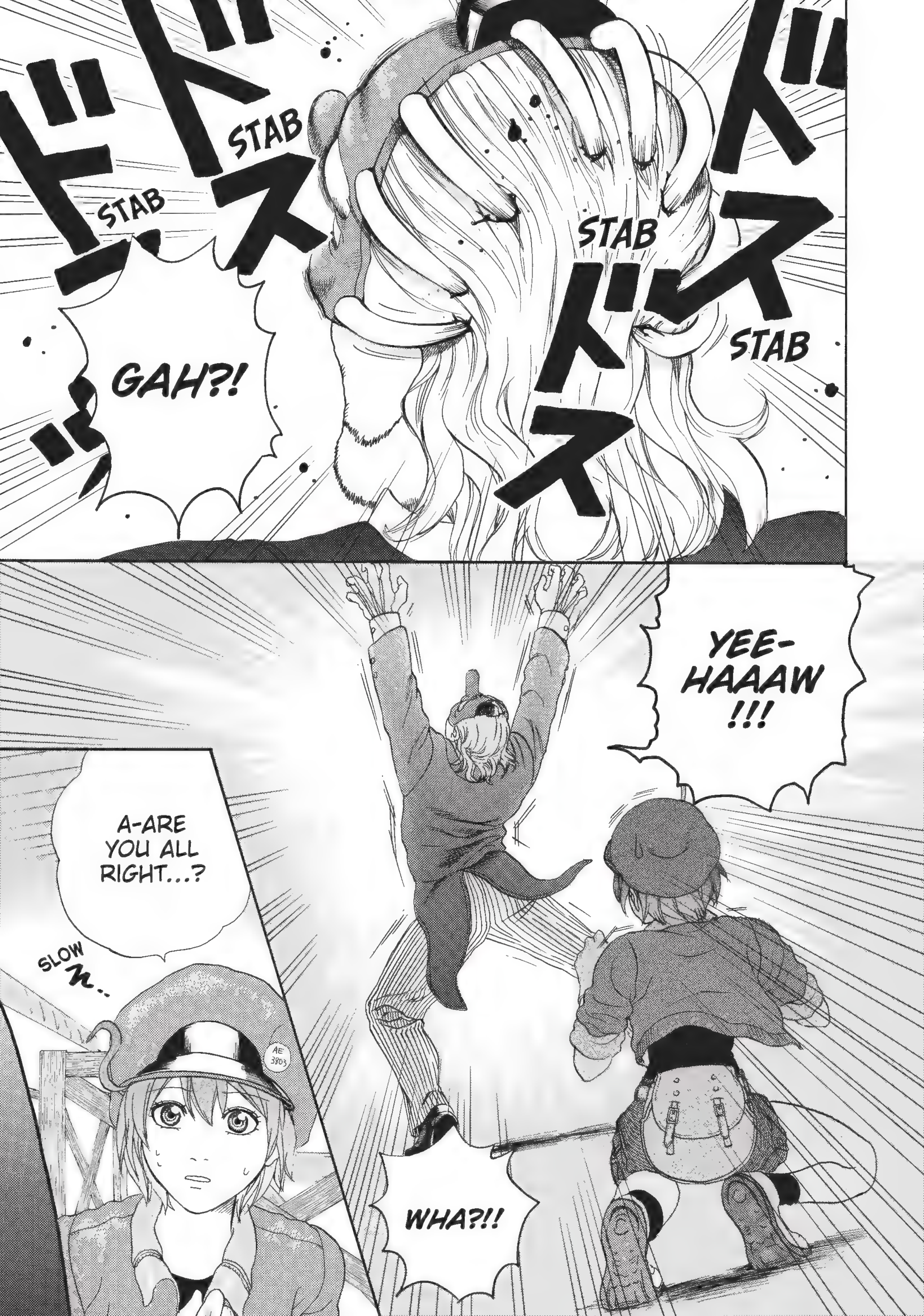

PSHHHHH
THIS DOESN'T LOOK GOOD! EVERYONE STAY AWAY—
...HUH?!
AUGH
EEEK

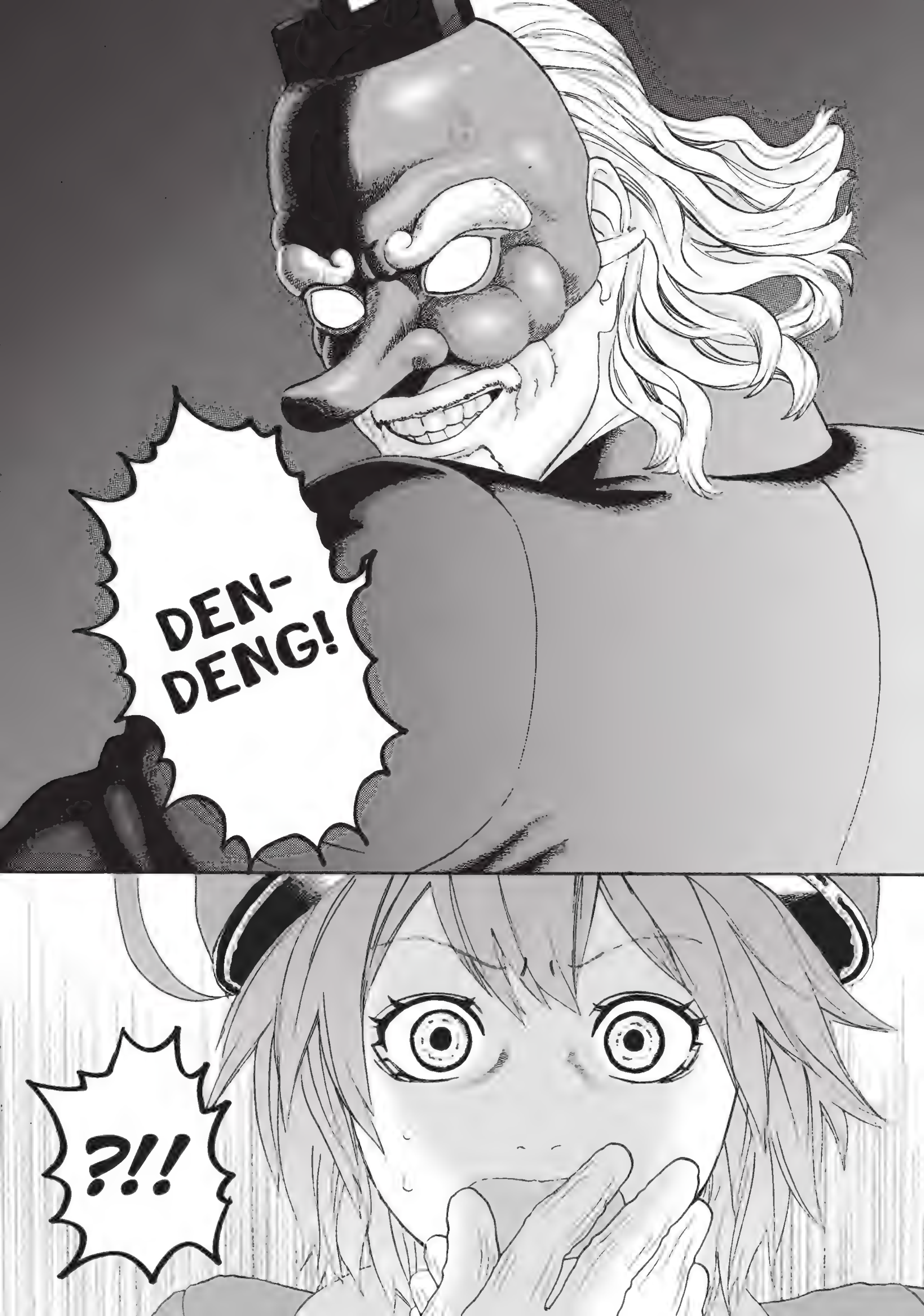

ぞろーーーん
GROGGY
DN 2009
GO 1050
UH... HUH...?
I'M... GETTING... SLEEPY... ZZZZ...
I FEEL...
ふわっ FLOAT
ふわ FLOAT
...ALL FLOATY... THIS IS NICE...
FLOAT ふわ
AE 3803
WH- WH-
WHAAA?!

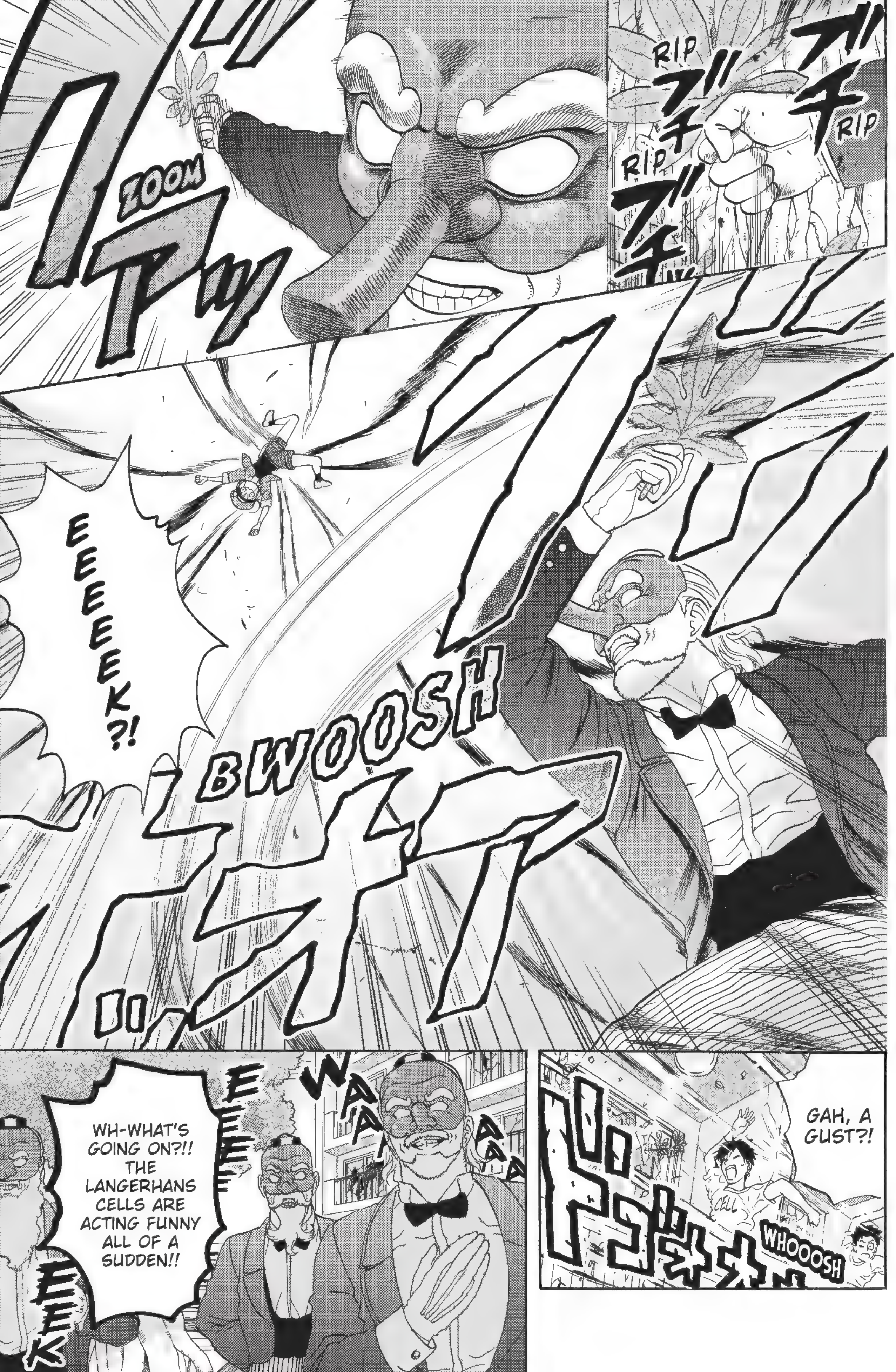

MYOOORRRRRP
ALL THE BLOOD CELLS ARE GETTING TAKEN?!!

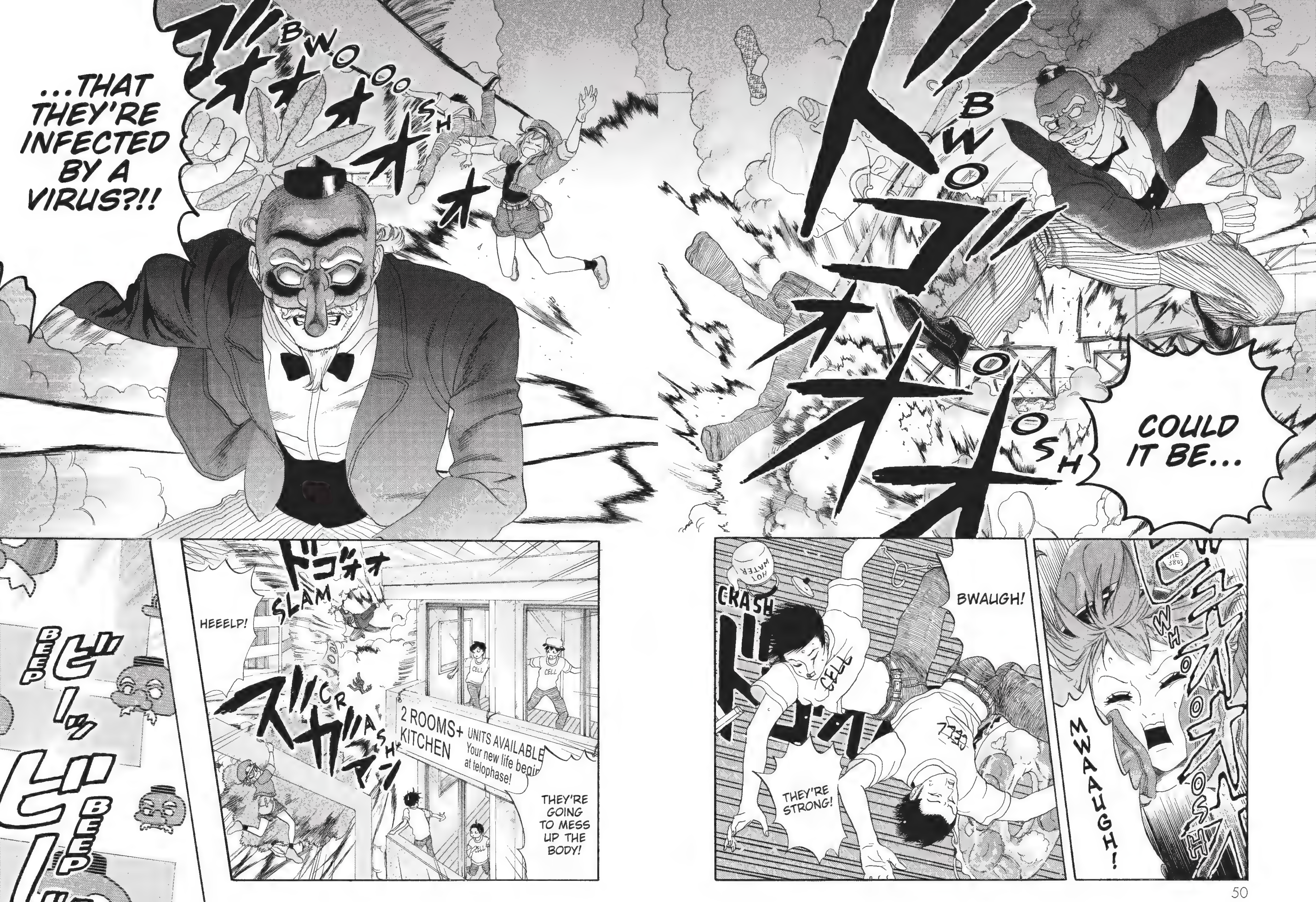

WHOA-WHOOOA!
PLINK
PLINK
I'M GETTING SUCKED IN, TOO...!
ROAR
BE STRONG!
REACH
HERE! TAKE MY HAND!
ROAR
GUH! GAH ...!
RRR
OH—!
RR
RRR
STOP
V.WRRRRRRR
HUH?
SPLAT
YOWCH!

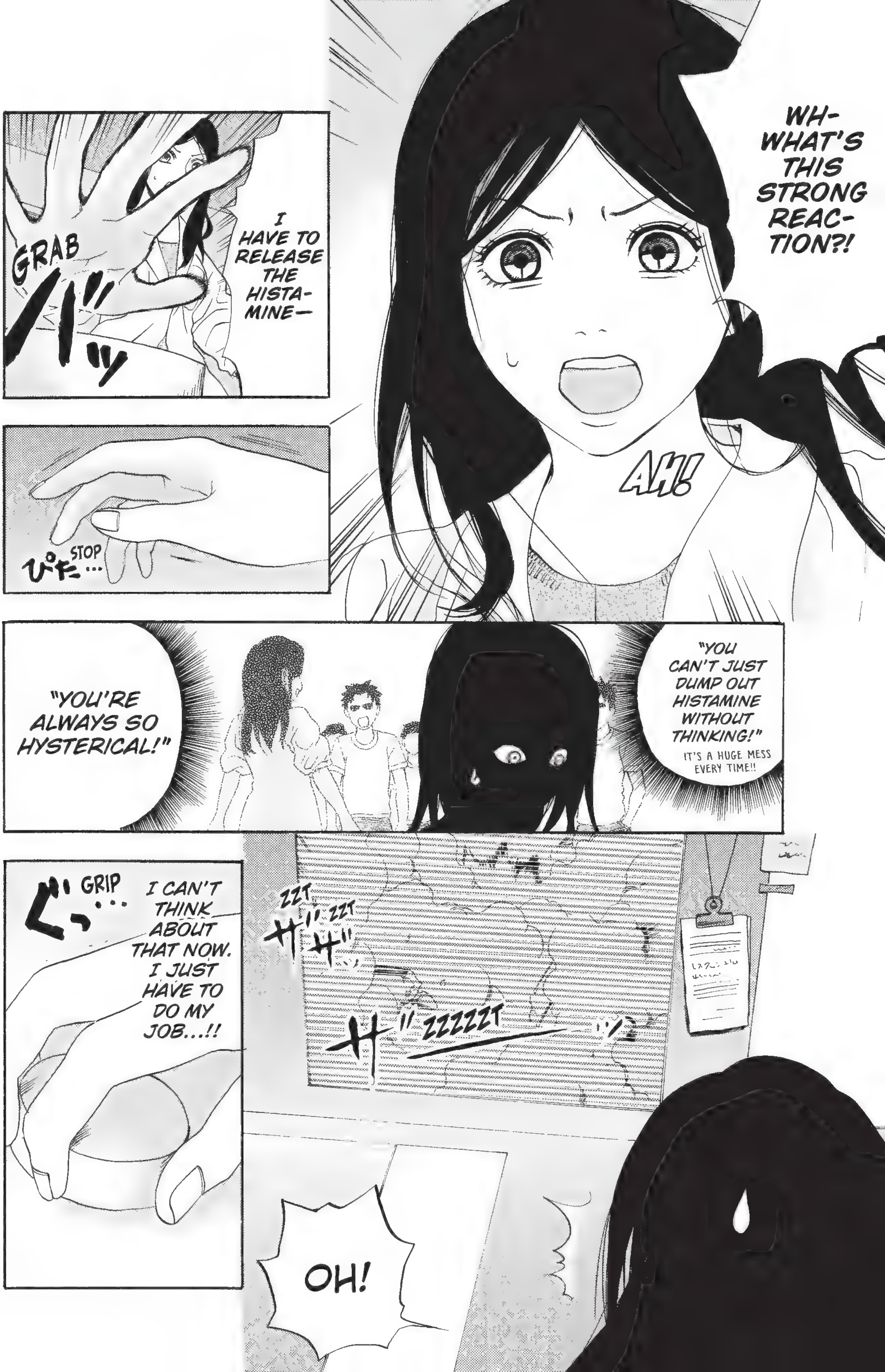

SILENCE
GASP!
IT'S GONE...
WH-WHAT WAS THAT...?!
HM?
I WONDER WHAT THIS IS...
カラ
KLAK
A MASK...?
HMM... I DON'T KNOW WHERE IT CAME FROM...
...BUT THIS MASK SEEMS TO HAVE A MYSTERIOUS ALLURE...
GROW
GROW
GROW

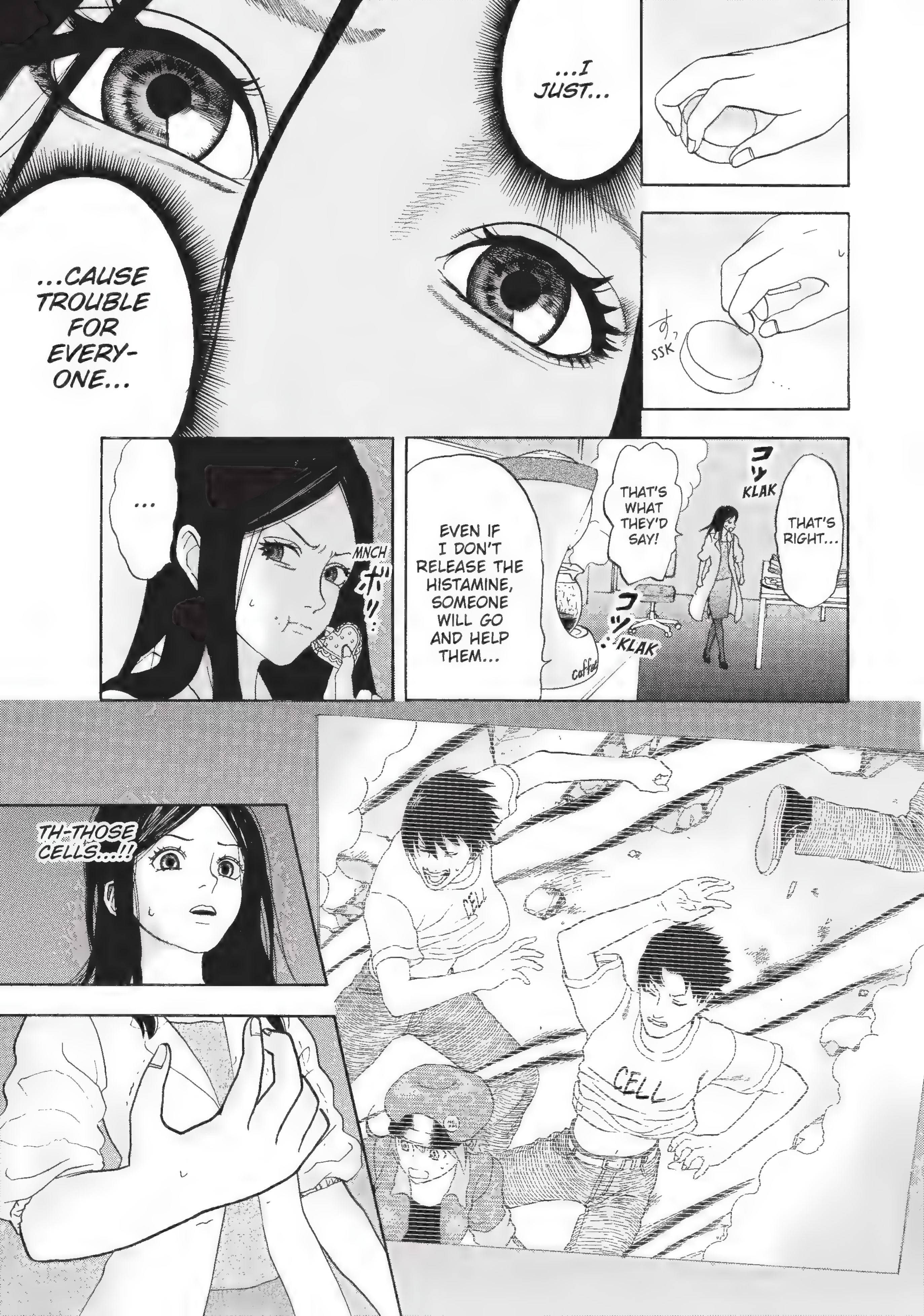

ドスッ
STAB
STAB
ドスッ
STAB
STAB
GAH?!
YEE-HAAAW!!!
A-ARE YOU ALL RIGHT...?
SLOW
AE 3803
WHA?!!

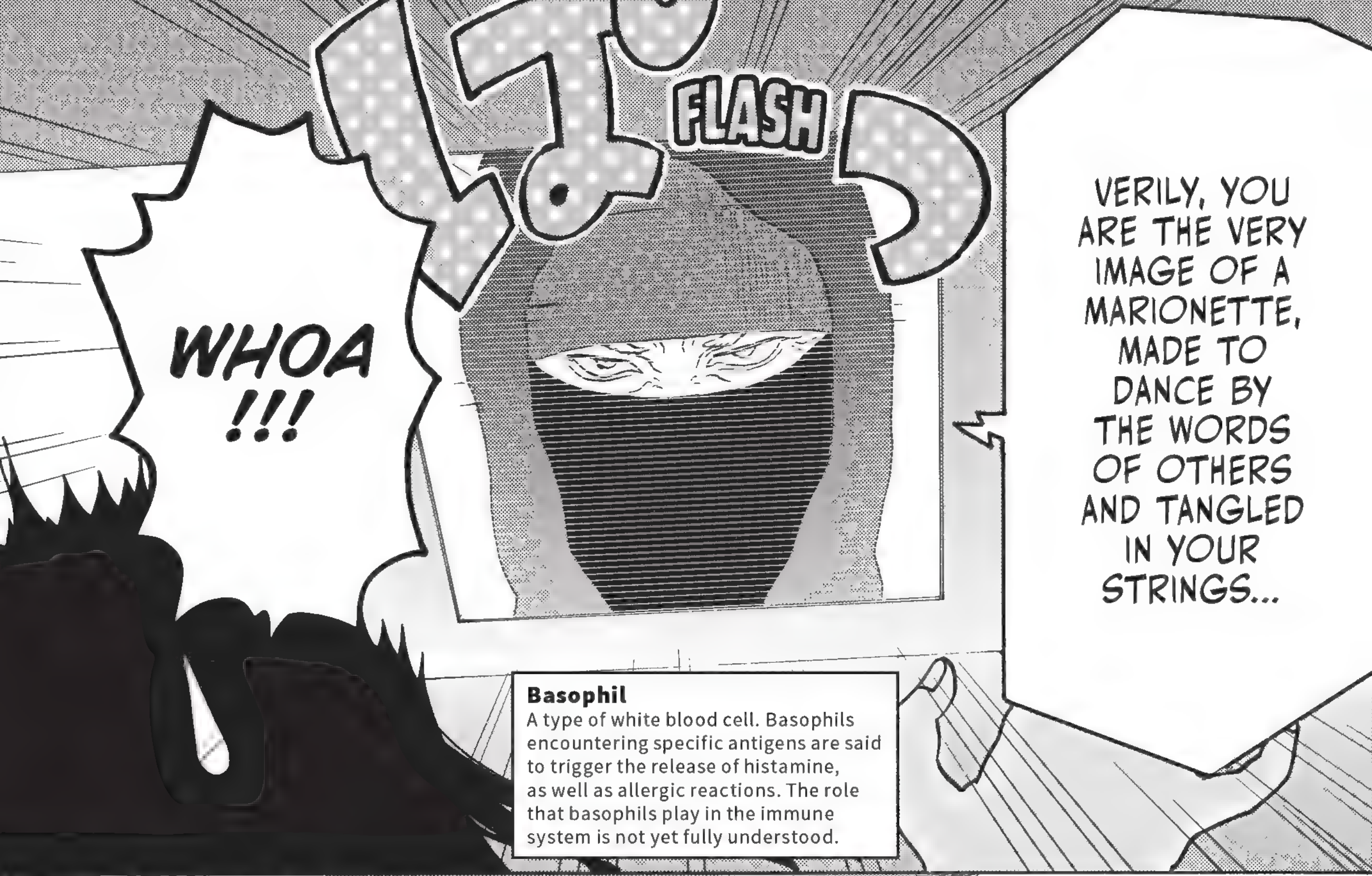

DEN-DENG!
?!!


RIP
RIP
RIP
ブチ
ブチ
ブチッ
ZOOM
ブアッ
EEEEEEEK?!
BWOOSH
ゴオオ
GAH, A GUST?!
CELL
WHOOOSH
ドゴォオッ
WAAAAAA
WH-WHAT'S GOING ON?!! THE LANGERHANS CELLS ARE ACTING FUNNY ALL OF A SUDDEN!!
EEEEEEK

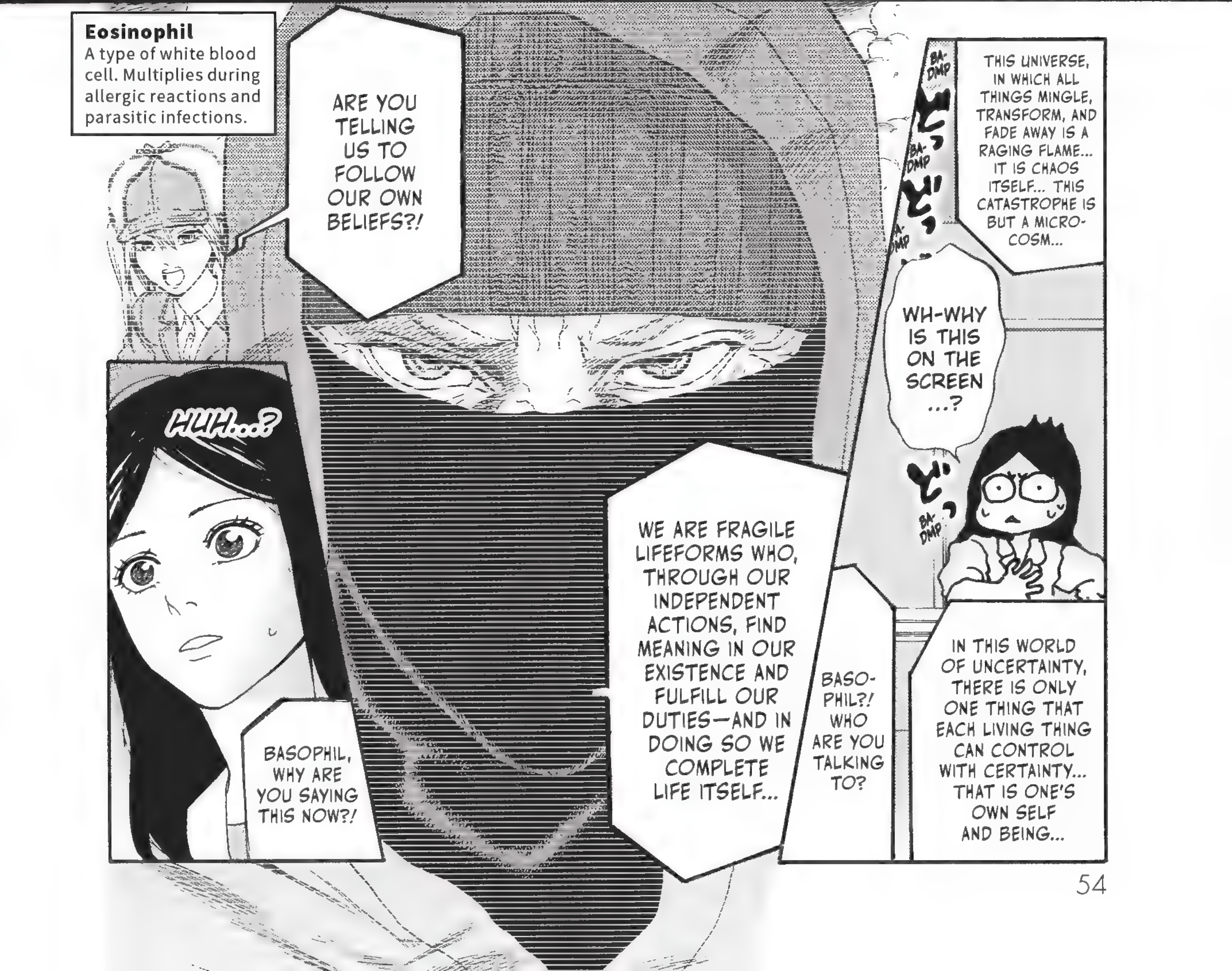

COULD IT BE...
ドゴォォォ
BWOOOSH
WHOOOSH
MWAUGH!
HOT WATER
BWAUGH!
CRASH
CELL
THEY'RE STRONG!
...THAT THEY'RE INFECTED BY A VIRUS?!!
ゴォォォォォ
BWOOOOOSH
ドゴォォ
SLAM
HEEELP!
スガシャァン
CRASH
2 ROOMS+ KITCHEN
UNITS AVAILABLE Your new life begin at telophase!
THEY'RE GOING TO MESS UP THE BODY!
ビーッ
BEEP
ビビーッ
BEEP


WH-WHAT'S THIS STRONG REACTION?!
AH!
GRAB
I HAVE TO RELEASE THE HISTAMINE—
STOP...
"YOU CAN'T JUST DUMP OUT HISTAMINE WITHOUT THINKING!"
IT'S A HUGE MESS EVERY TIME!!
"YOU'RE ALWAYS SO HYSTERICAL!"
ZZT ZZT
ZZZZZT
OH!
GRIP...
I CAN'T THINK ABOUT THAT NOW. I JUST HAVE TO DO MY JOB...!!

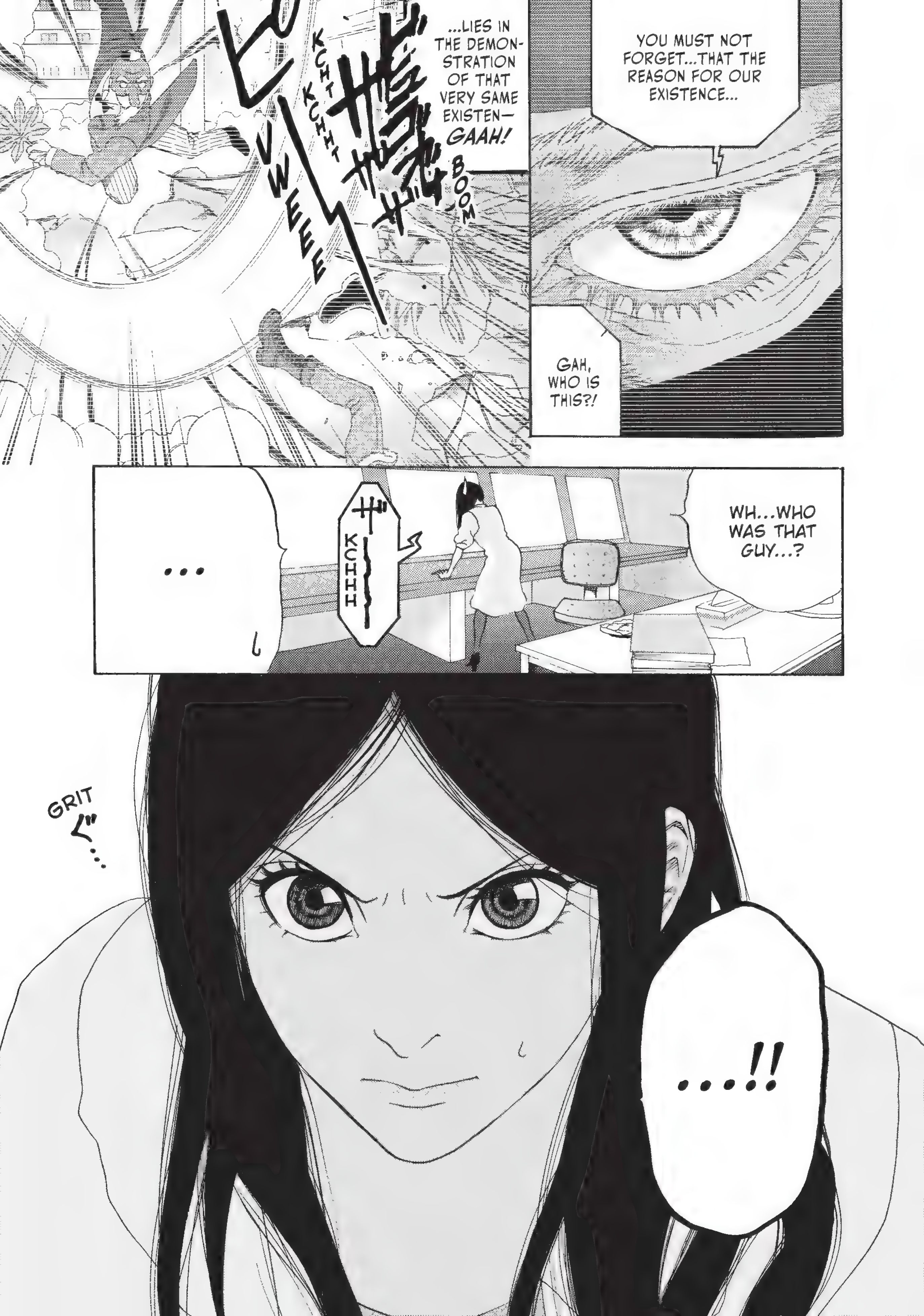

...I JUST...
すっ SSK
...CAUSE TROUBLE FOR EVERYONE...
THAT'S RIGHT...
コツ KLAK
THAT'S WHAT THEY'D SAY!
EVEN IF I DON'T RELEASE THE HISTAMINE, SOMEONE WILL GO AND HELP THEM...
コツ KLAK
...
MNCH ボリ
TH-THOSE CELLS...!!
CELL

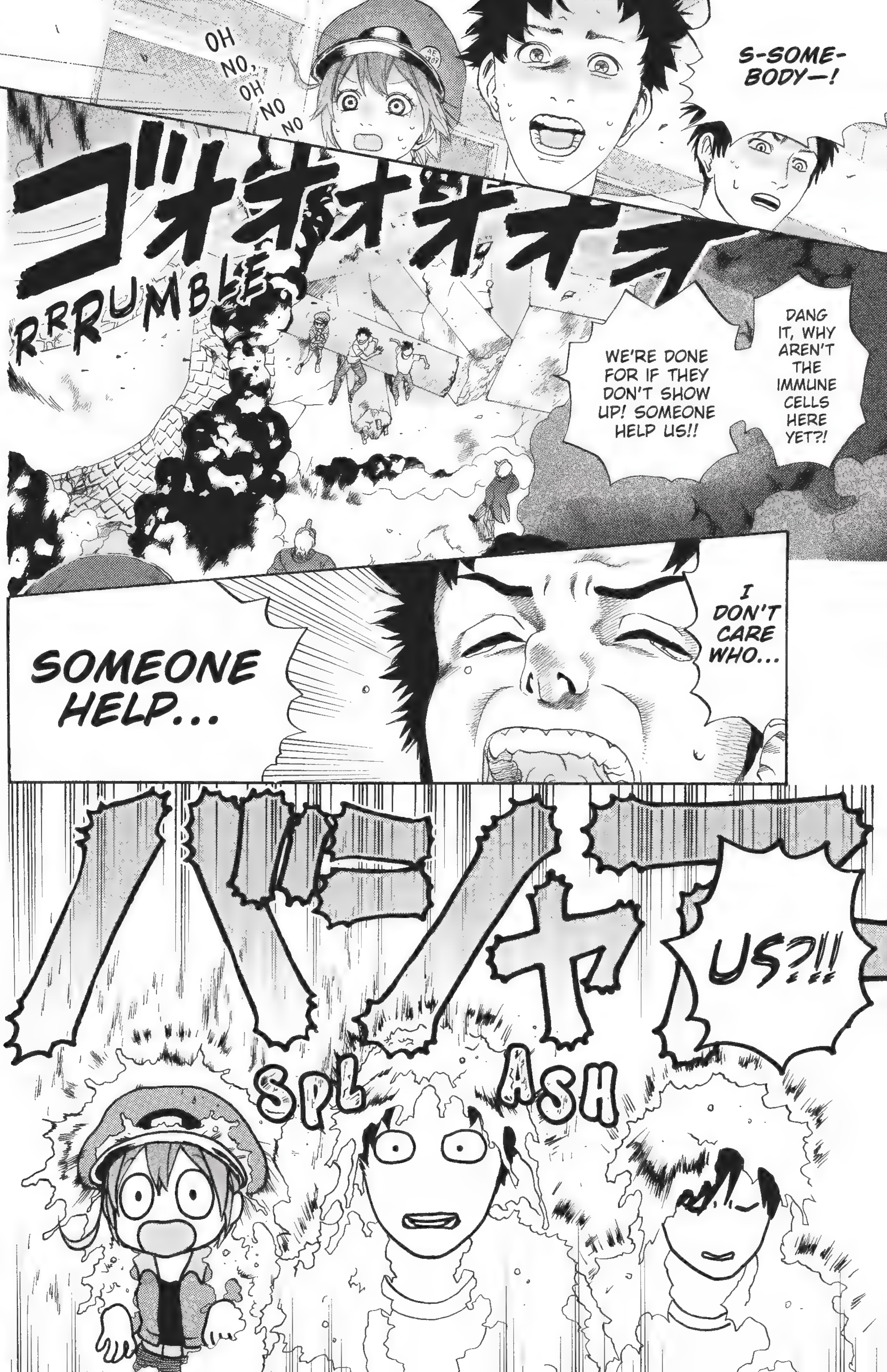

FLASH
VERILY, YOU ARE THE VERY IMAGE OF A MARIONETTE, MADE TO DANCE BY THE WORDS OF OTHERS AND TANGLED IN YOUR STRINGS...
WHOA !!!

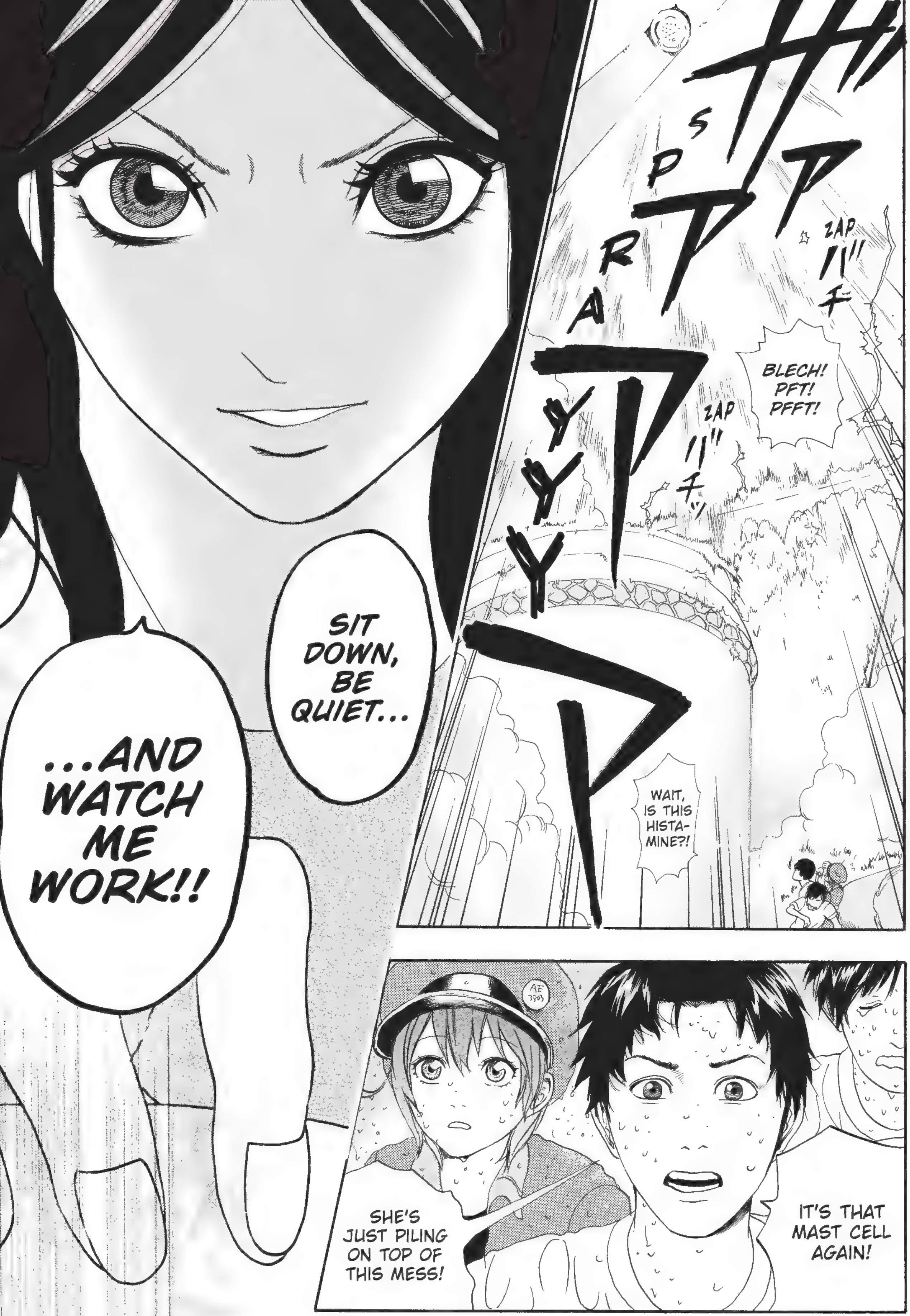
**Basophil**
A type of white blood cell. Basophils encountering specific antigens are said to trigger the release of histamine, as well as allergic reactions. The role that basophils play in the immune system is not yet fully understood.

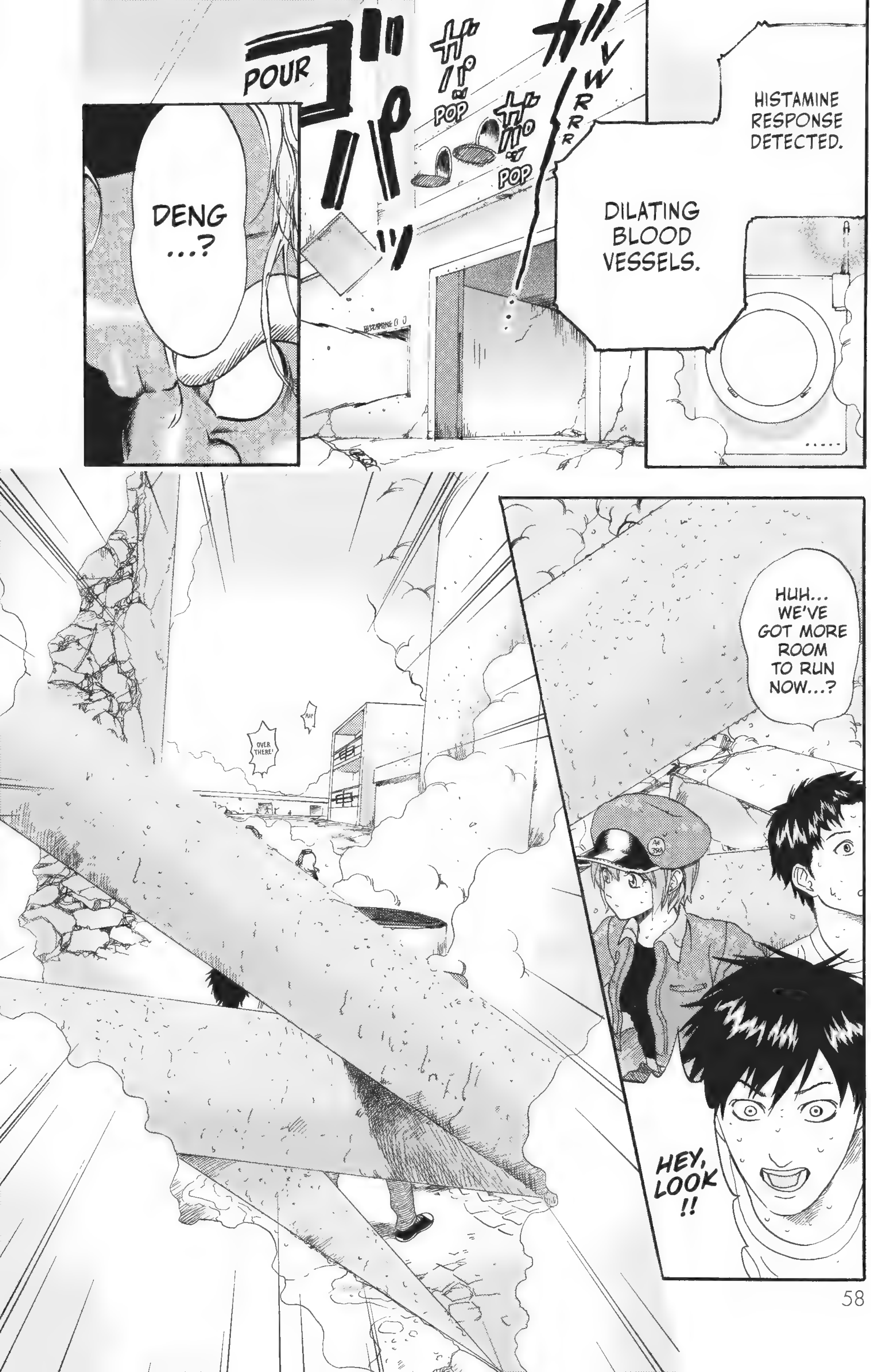

THIS UNIVERSE, IN WHICH ALL THINGS MINGLE, TRANSFORM, AND FADE AWAY IS A RAGING FLAME... IT IS CHAOS ITSELF... THIS CATASTROPHE IS BUT A MICROCOSM...
BA-DMP
BA-DMP
BA-DMP
WH-WHY IS THIS ON THE SCREEN ...?
BA-DMP
ARE YOU TELLING US TO FOLLOW OUR OWN BELIEFS?!
IN THIS WORLD OF UNCERTAINTY, THERE IS ONLY ONE THING THAT EACH LIVING THING CAN CONTROL WITH CERTAINTY... THAT IS ONE'S OWN SELF AND BEING...
BASOPHIL?! WHO ARE YOU TALKING TO?
WE ARE FRAGILE LIFEFORMS WHO, THROUGH OUR INDEPENDENT ACTIONS, FIND MEANING IN OUR EXISTENCE AND FULFILL OUR DUTIES—AND IN DOING SO WE COMPLETE LIFE ITSELF...
HUH...?
BASOPHIL, WHY ARE YOU SAYING THIS NOW?!

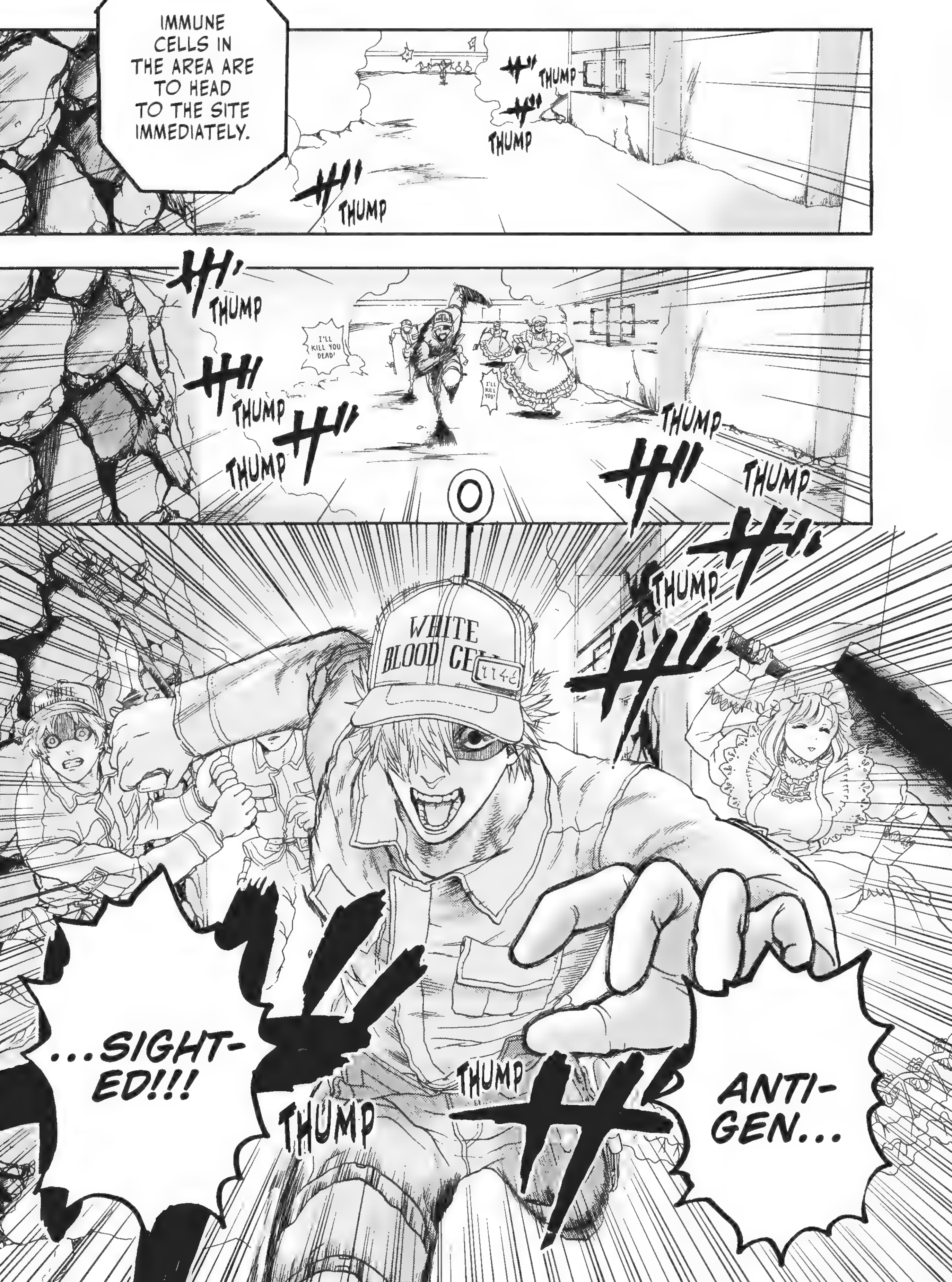
**Eosinophil**
A type of white blood cell. Multiplies during allergic reactions and parasitic infections.

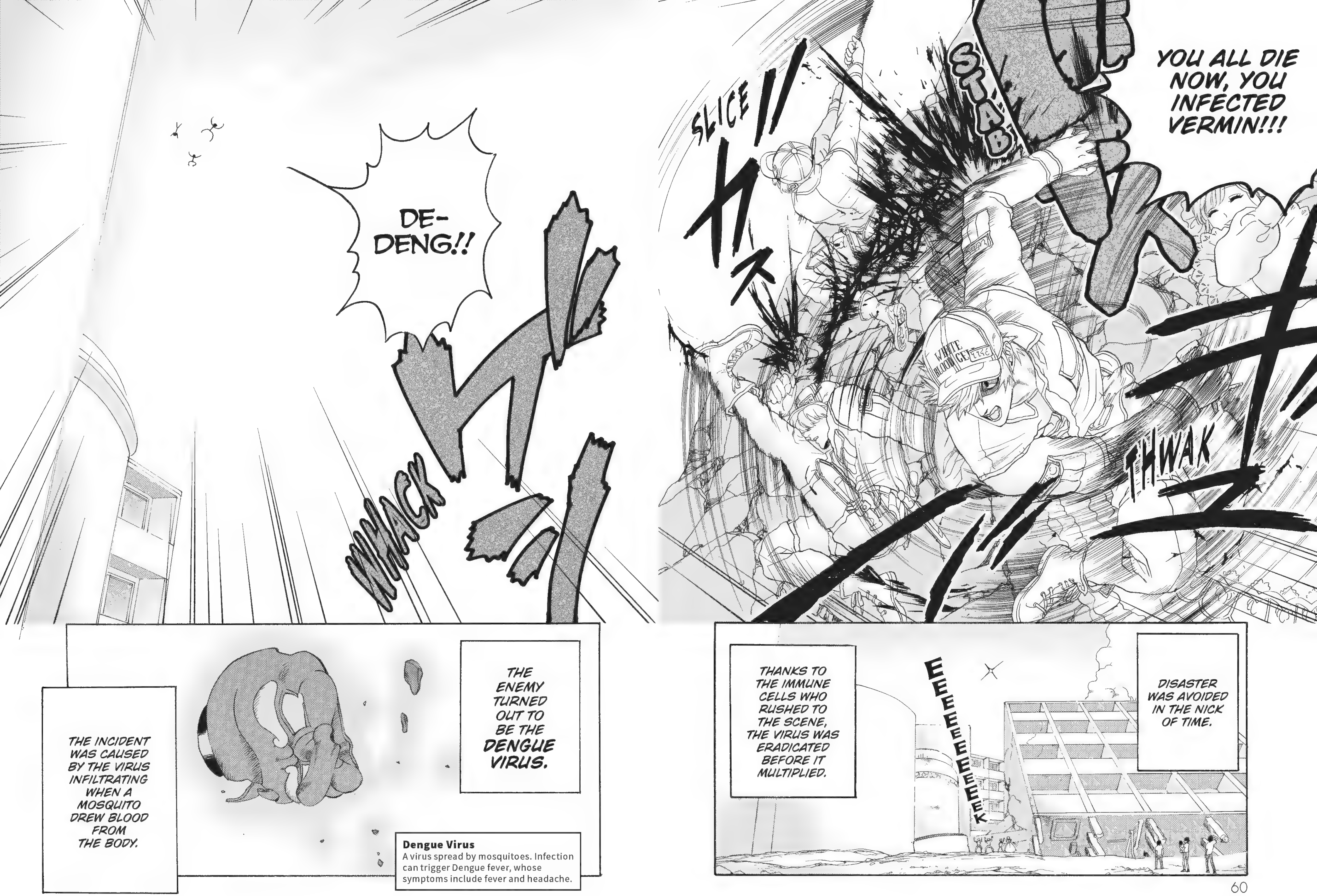

YOU MUST NOT FORGET...THAT THE REASON FOR OUR EXISTENCE...
GAH, WHO IS THIS?!
...LIES IN THE DEMONSTRATION OF THAT VERY SAME EXISTEN— GAAH!
KCHT KCHHT
VWEEEE
BOOM
WH...WHO WAS THAT GUY...?
KCHHHH
...
...!!
GRIT


S-SOMEBODY—!
OH NO, OH NO NO
ゴオオオオオオ
RRRUMBLE
DANG IT, WHY AREN'T THE IMMUNE CELLS HERE YET?!
WE'RE DONE FOR IF THEY DON'T SHOW UP! SOMEONE HELP US!!
I DON'T CARE WHO...
SOMEONE HELP...
US?!!
バシャー
SPLASH

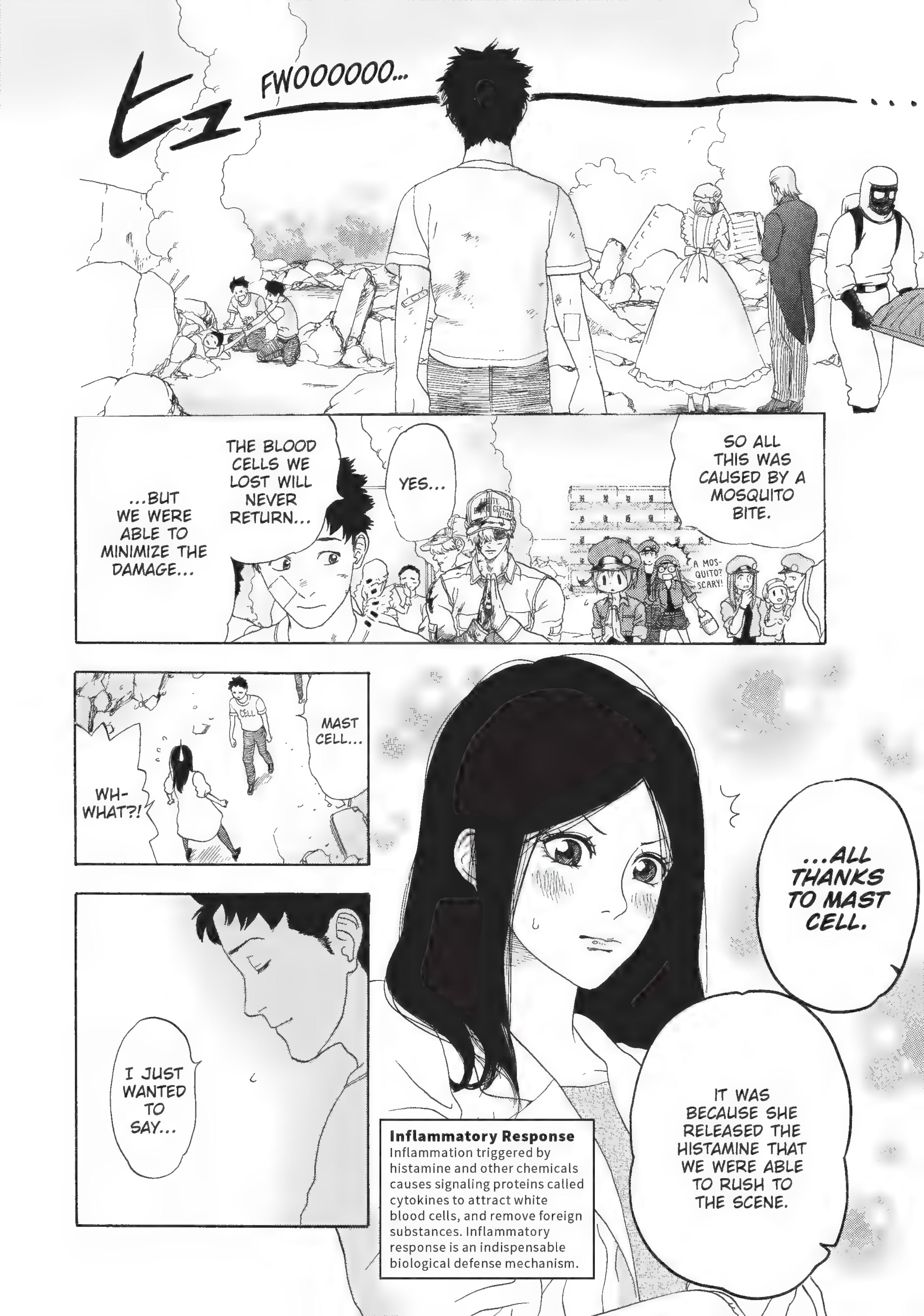

ザアアアア
SPRAYYYY
ZAP バチ
BLECH! PFT! PFFT!
ZAP バチッ
WAIT, IS THIS HISTAMINE?!
AE 3803
IT'S THAT MAST CELL AGAIN!
SHE'S JUST PILING ON TOP OF THIS MESS!
SIT DOWN, BE QUIET...
...AND WATCH ME WORK!!


HISTAMINE RESPONSE DETECTED.
DILATING BLOOD VESSELS.
ガ WRRR
ガパ POP
ガパ POP
ゴパッ POUR
HISTAMINE
DENG ...?
HUH... WE'VE GOT MORE ROOM TO RUN NOW...?
HEY, LOOK!!
AH!
OVER THERE!

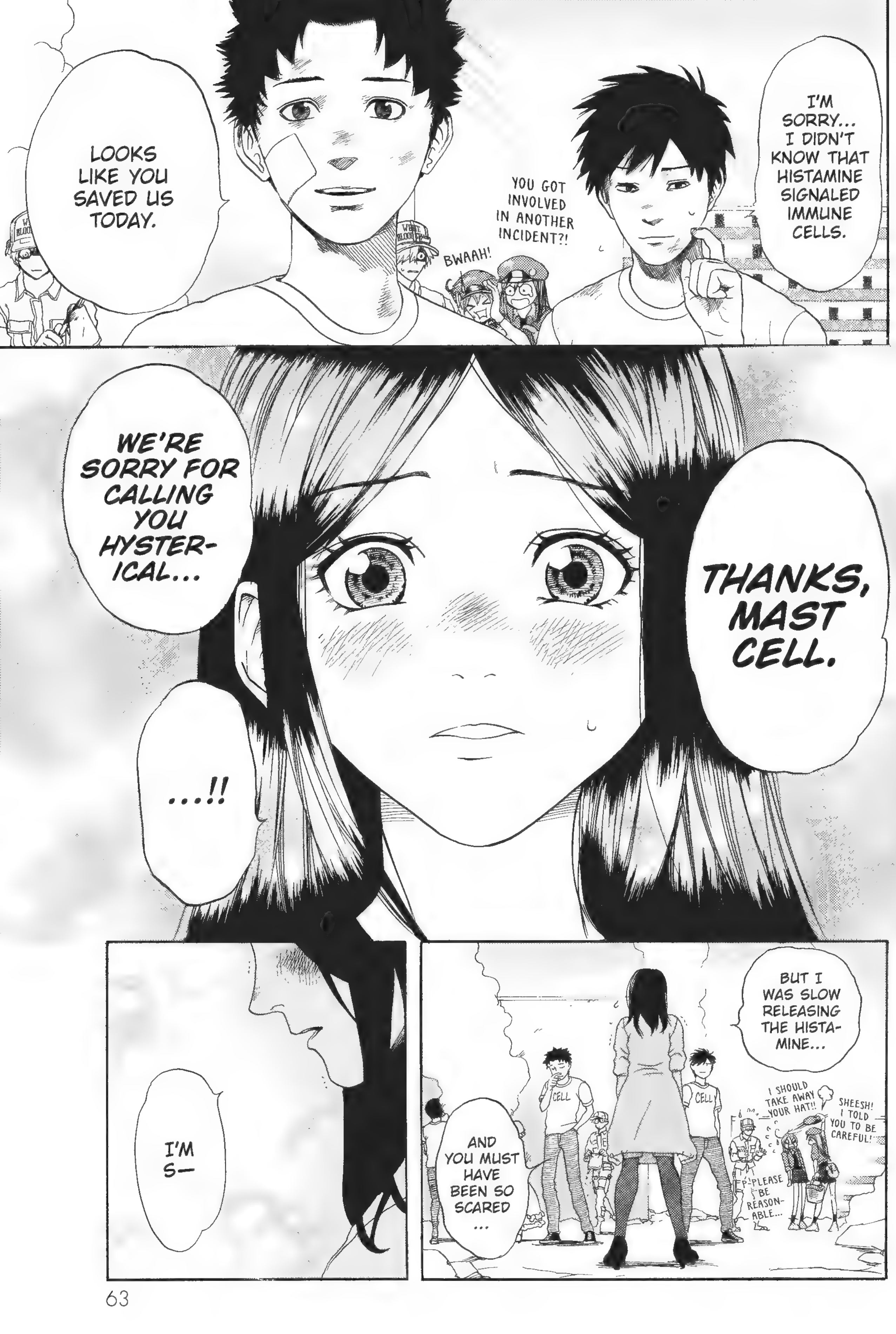

IMMUNE CELLS IN THE AREA ARE TO HEAD TO THE SITE IMMEDIATELY.
ザッ THUMP
ザッ THUMP
ザッ THUMP
ザッ THUMP
ザッ THUMP
ザッ THUMP
I'LL KILL YOU!
I'LL KILL YOU DEAD!
ザッ THUMP
ザッ THUMP
ザッ THUMP
ザッ THUMP
ANTI-GEN...
...SIGHTED!!!
ザッ THUMP
ザッ THUMP

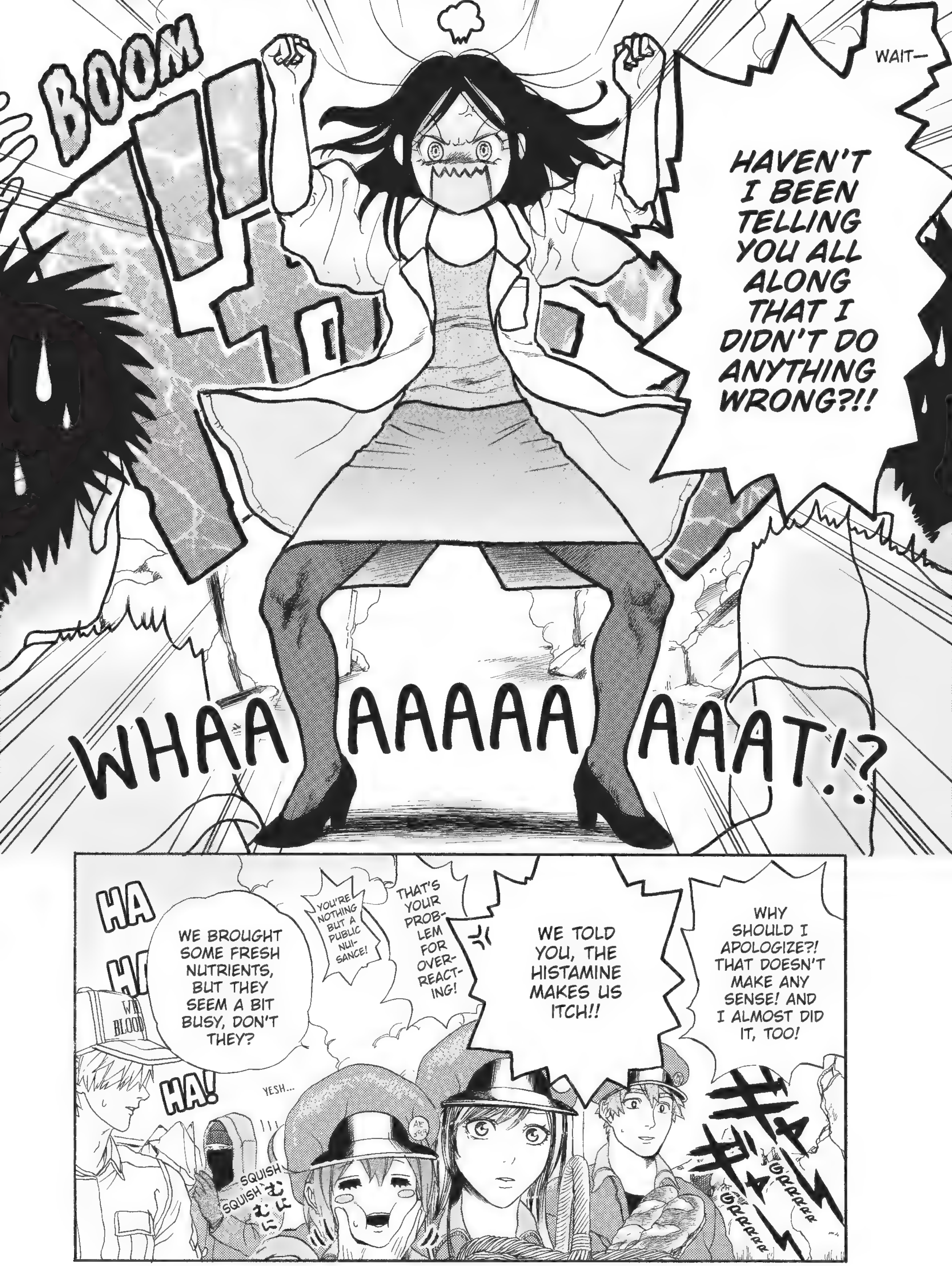

WHACK
DE-DENG!!
SLICE
ガス
STAB
YOU ALL DIE NOW, YOU INFECTED VERMIN!!!
THWAK
THE INCIDENT WAS CAUSED BY THE VIRUS INFILTRATING WHEN A MOSQUITO DREW BLOOD FROM THE BODY.
THE ENEMY TURNED OUT TO BE THE DENGUE VIRUS.
THANKS TO THE IMMUNE CELLS WHO RUSHED TO THE SCENE, THE VIRUS WAS ERADICATED BEFORE IT MULTIPLIED.
EEEEEEEEEEK
DISASTER WAS AVOIDED IN THE NICK OF TIME.

**Dengue Virus**
A virus spread by mosquitoes. Infection can trigger Dengue fever, whose symptoms include fever and headache.


ヒュ
FWOOOOOO...
SO ALL THIS WAS CAUSED BY A MOSQUITO BITE.
YES...
THE BLOOD CELLS WE LOST WILL NEVER RETURN...
...BUT WE WERE ABLE TO MINIMIZE THE DAMAGE...
A MOSQUITO? SCARY!
...ALL THANKS TO MAST CELL.
IT WAS BECAUSE SHE RELEASED THE HISTAMINE THAT WE WERE ABLE TO RUSH TO THE SCENE.
MAST CELL...
WH-WHAT?!
I JUST WANTED TO SAY...

**Inflammatory Response**
Inflammation triggered by histamine and other chemicals causes signaling proteins called cytokines to attract white blood cells, and remove foreign substances. Inflammatory response is an indispensable biological defense mechanism.


I'M SORRY... I DIDN'T KNOW THAT HISTAMINE SIGNALED IMMUNE CELLS.
YOU GOT INVOLVED IN ANOTHER INCIDENT?!
BWAAH!
WHITE BLOOD CELL
LOOKS LIKE YOU SAVED US TODAY.
THANKS, MAST CELL.
WE'RE SORRY FOR CALLING YOU HYSTERICAL...
...!!
BUT I WAS SLOW RELEASING THE HISTAMINE...
SHEESH! I TOLD YOU TO BE CAREFUL!
I SHOULD TAKE AWAY YOUR HAT!!
PLEASE BE REASONABLE...
CELL
CELL
AND YOU MUST HAVE BEEN SO SCARED...
I'M S—

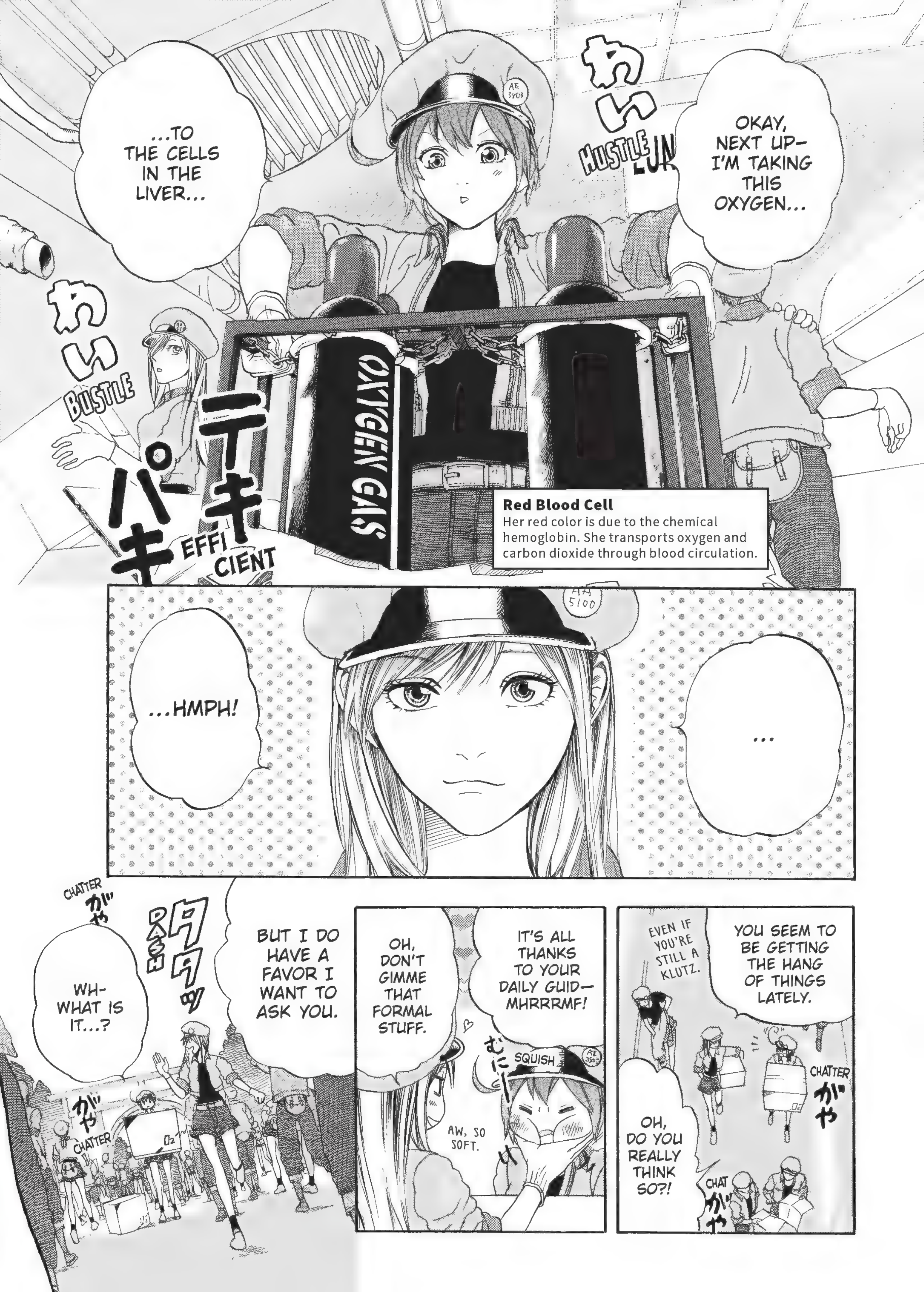

WAIT—
HAVEN'T I BEEN TELLING YOU ALL ALONG THAT I DIDN'T DO ANYTHING WRONG?!!
BOOM
WHAA AAAAA AAAT!?
WHY SHOULD I APOLOGIZE?! THAT DOESN'T MAKE ANY SENSE! AND I ALMOST DID IT, TOO!
ギャ ギャ
GRRRRRR
GRRRRRR
GRRRRRR
WE TOLD YOU, THE HISTAMINE MAKES US ITCH!!
THAT'S YOUR PROBLEM FOR OVERREACTING!
YOU'RE NOTHING BUT A PUBLIC NUISANCE!
WE BROUGHT SOME FRESH NUTRIENTS, BUT THEY SEEM A BIT BUSY, DON'T THEY?
HA HA HA!
YESH...
SQUISH SQUISH むにむに

**CHAPTER 16: END**

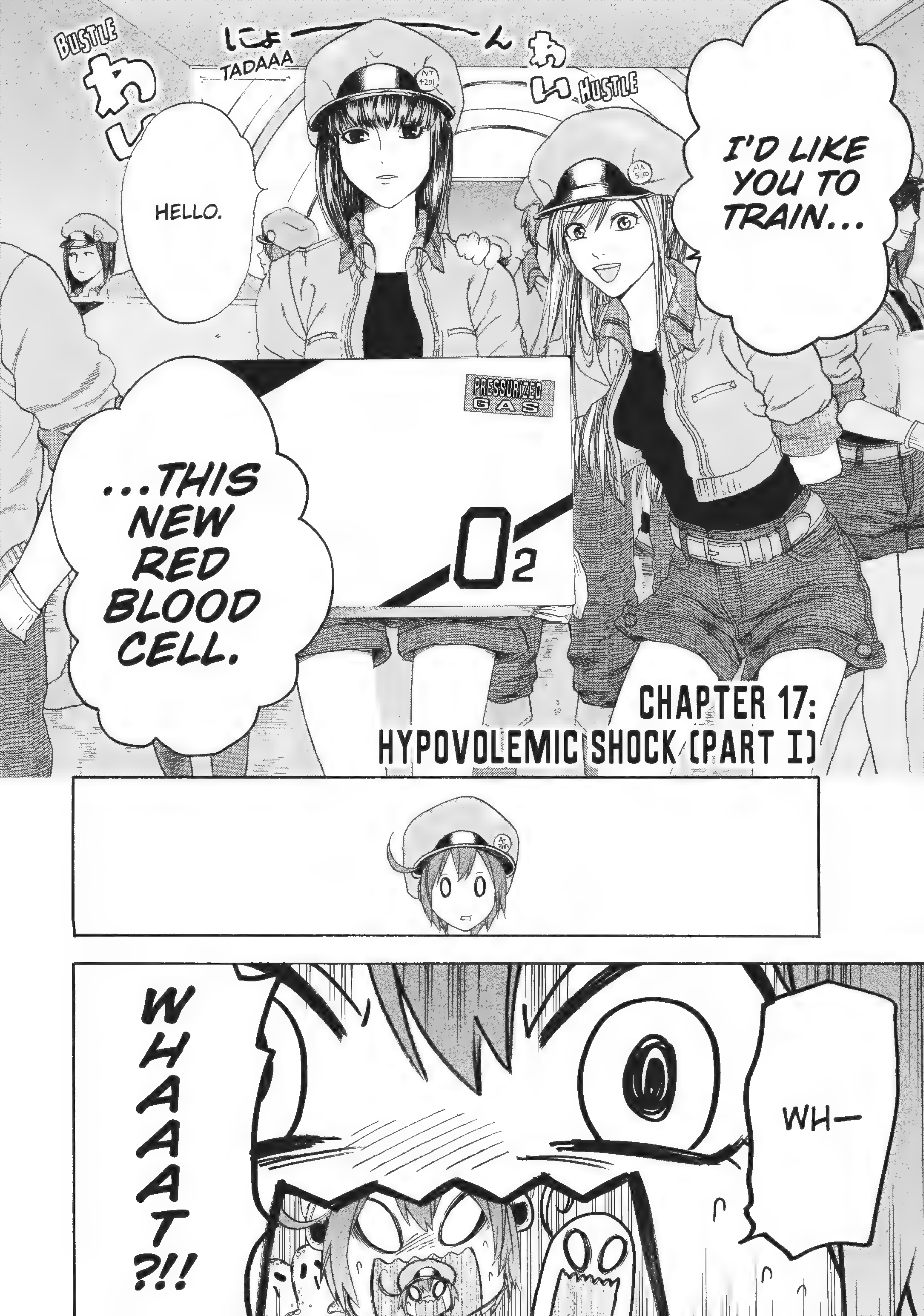
AE
3803
$O_2$
PLATELET

Cells at Work!

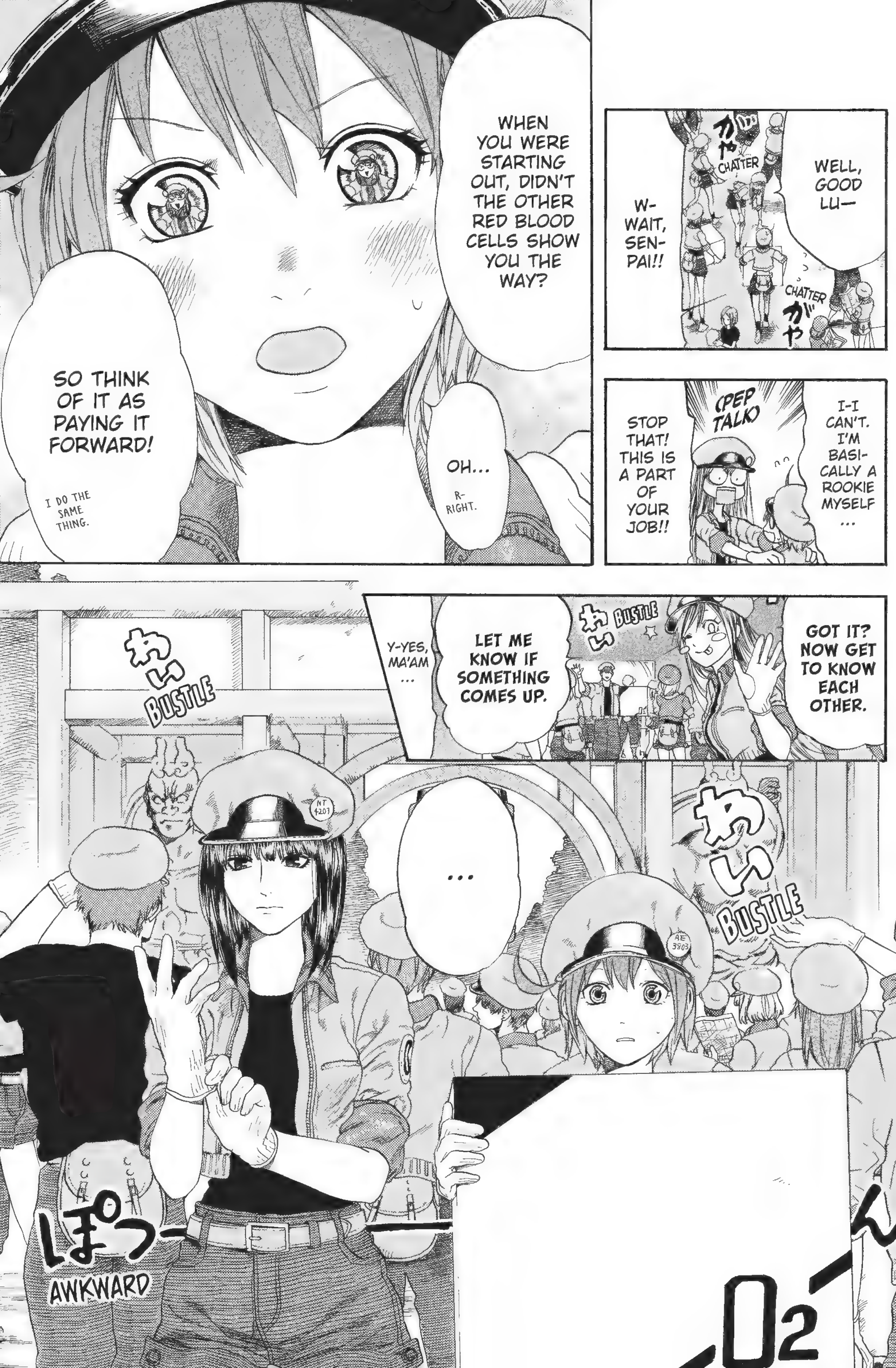
はたらく細胞

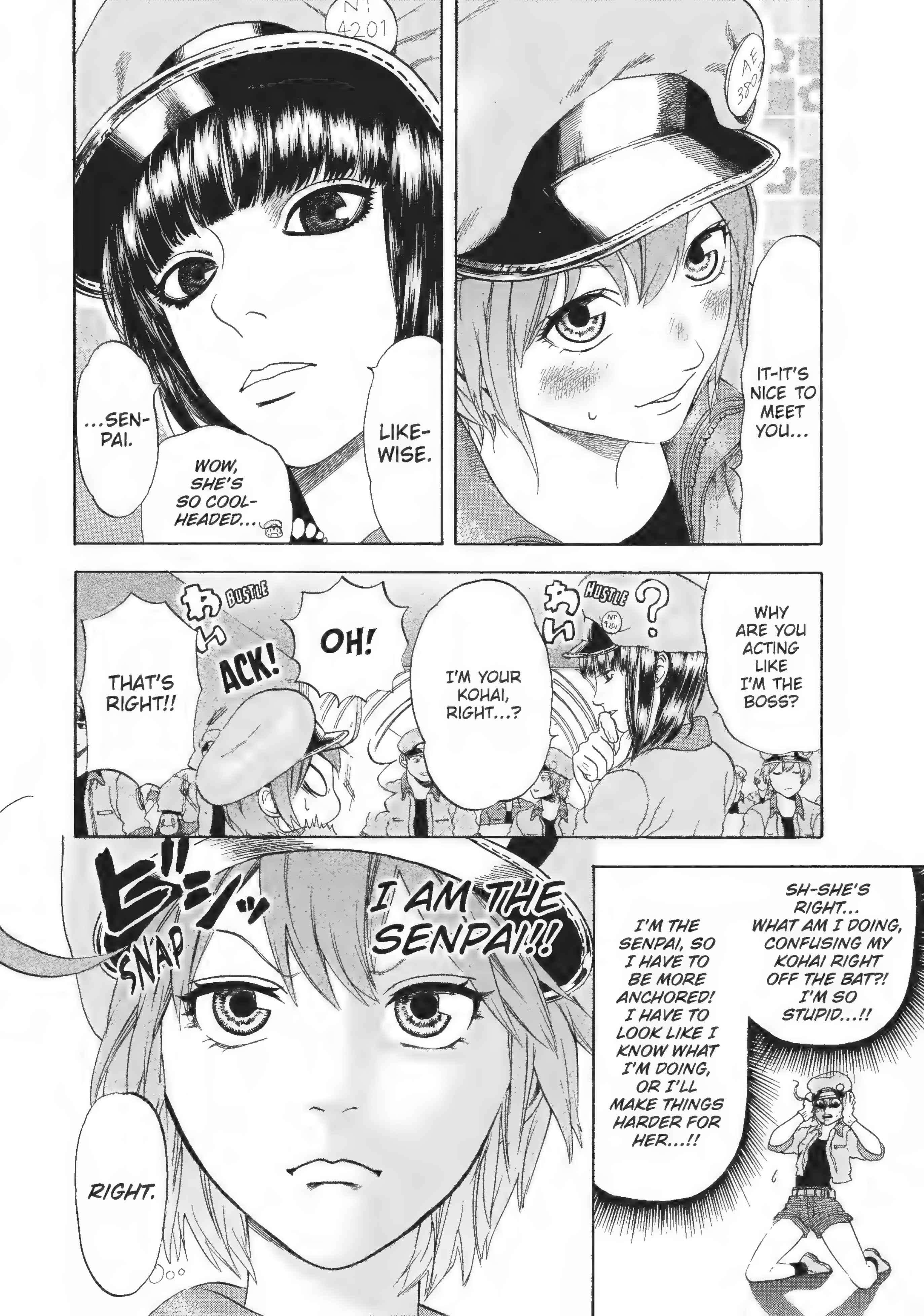

OKAY, NEXT UP— I'M TAKING THIS OXYGEN...
わん
HUSTLE
...TO THE CELLS IN THE LIVER...
AE 3803
わい
BUSTLE
テキパキ
EFFICIENT
OXYGEN GAS
AA 5100
...
...HMPH!
YOU SEEM TO BE GETTING THE HANG OF THINGS LATELY.
EVEN IF YOU'RE STILL A KLUTZ.
CHATTER
ガヤ
OH, DO YOU REALLY THINK SO?!
CHAT
ガヤ
IT'S ALL THANKS TO YOUR DAILY GUID—MHRRRMF!
OH, DON'T GIMME THAT FORMAL STUFF.
SQUISH
むにー
AW, SO SOFT.
BUT I DO HAVE A FAVOR I WANT TO ASK YOU.
タタッ
DASH
CHATTER
ガヤ
WH-WHAT IS IT...?
ガヤ
CHATTER
O2

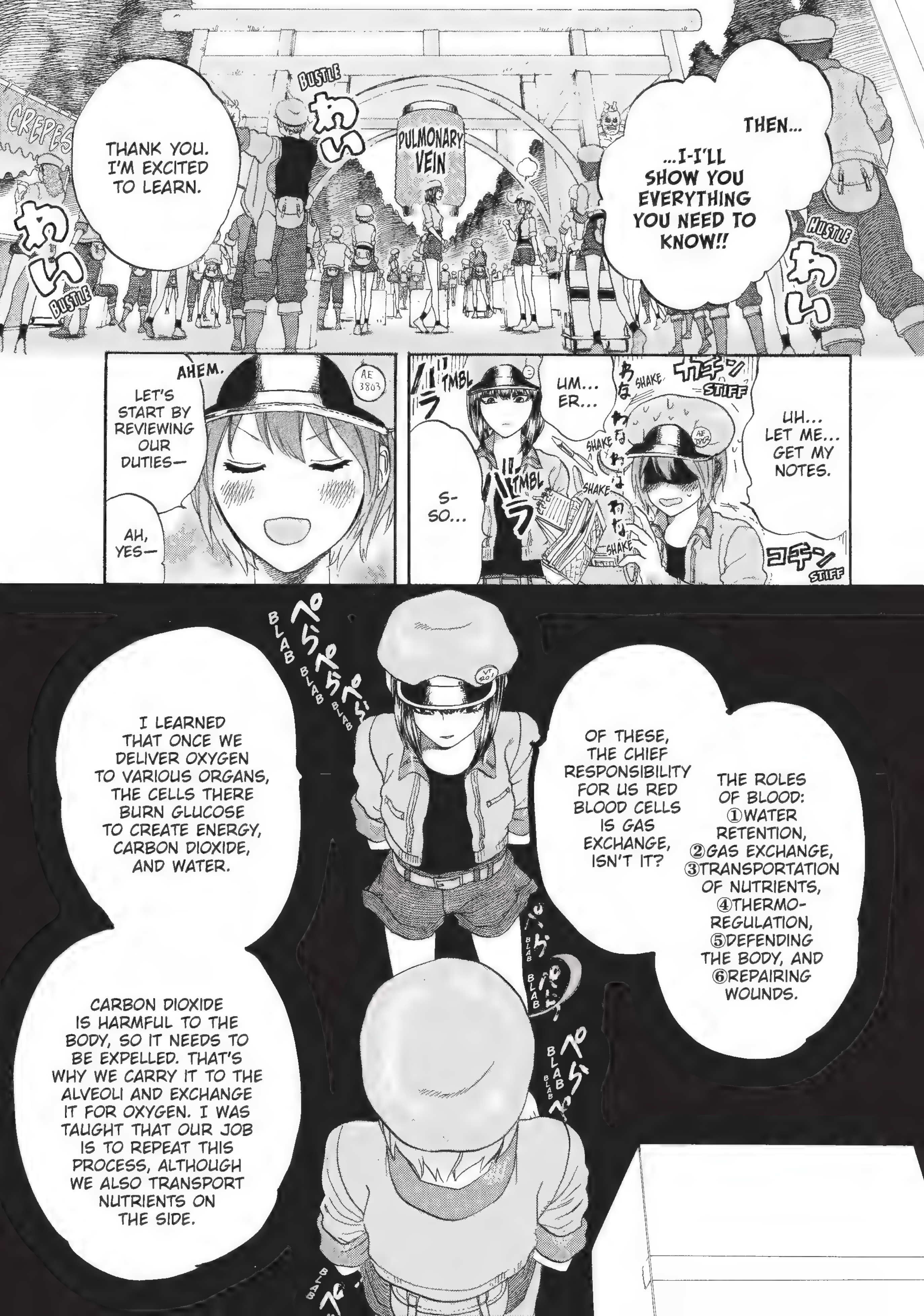
**Red Blood Cell**
Her red color is due to the chemical hemoglobin. She transports oxygen and carbon dioxide through blood circulation.

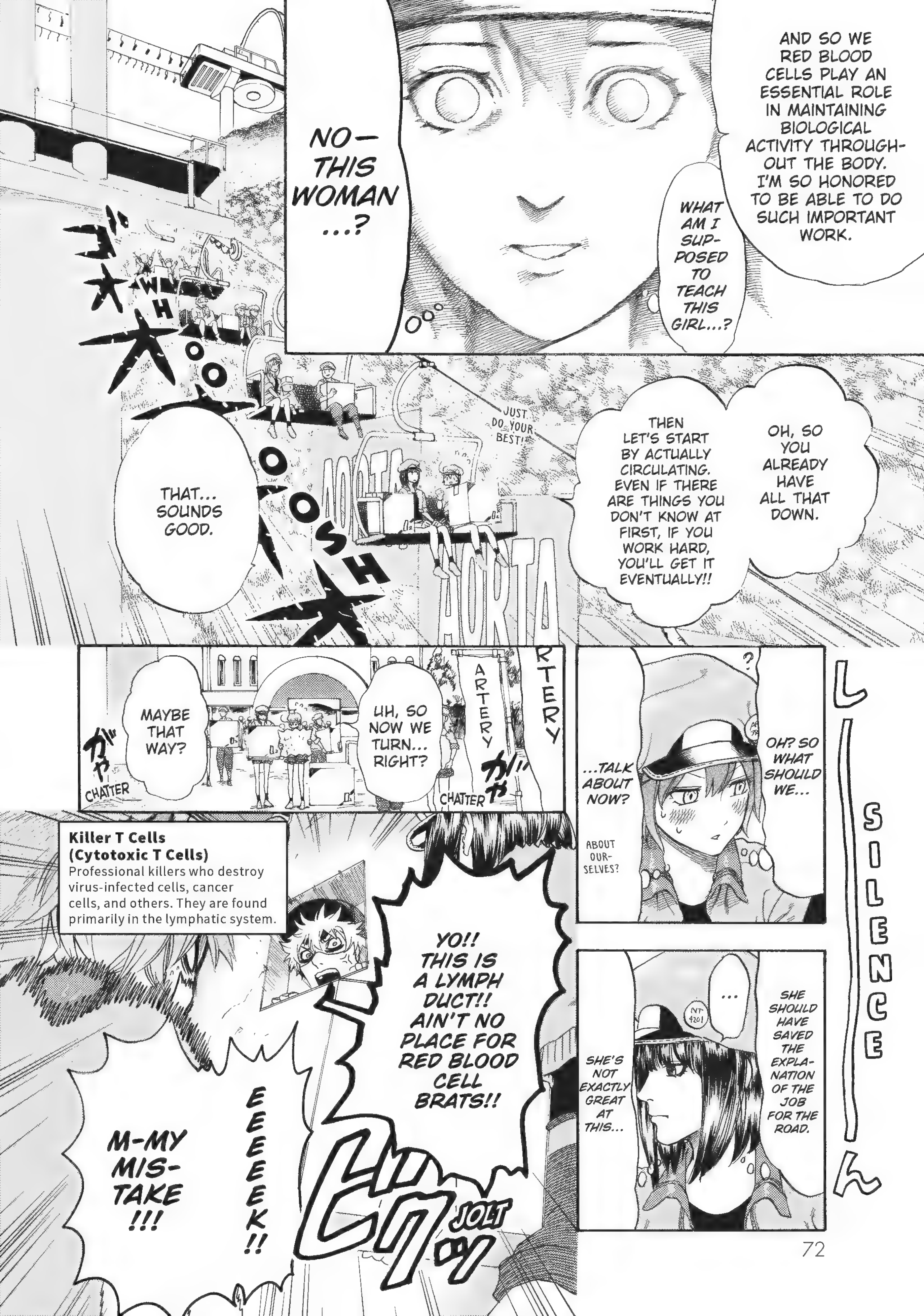

にょーーーーん
TADAAA
わい
BUSTLE
わい
HUSTLE
NT 4201
I'D LIKE YOU TO TRAIN...
...THIS NEW RED BLOOD CELL.
HELLO.
PRESSURIZED GAS
O2
AE 3803
WH—
WHAAAAT?!!

## CHAPTER 17: HYPOVOLEMIC SHOCK (PART I)

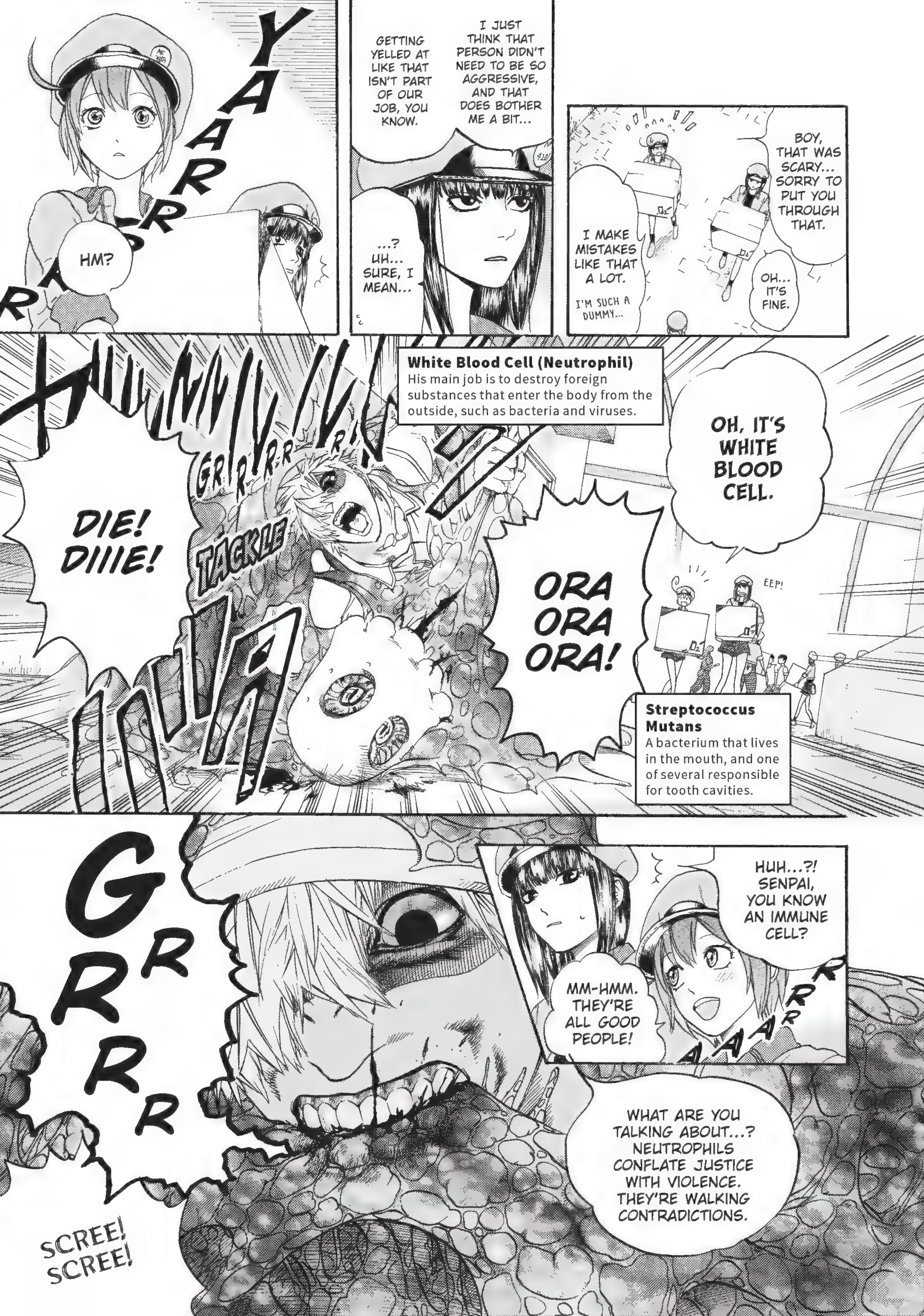

WHEN YOU WERE STARTING OUT, DIDN'T THE OTHER RED BLOOD CELLS SHOW YOU THE WAY?
SO THINK OF IT AS PAYING IT FORWARD!
I DO THE SAME THING.
OH...
R-RIGHT.
がや
CHATTER
がや
CHATTER
WELL, GOOD LU—
W-WAIT, SEN-PAI!!
(PEP TALK)
I-I CAN'T. I'M BASICALLY A ROOKIE MYSELF...
STOP THAT! THIS IS A PART OF YOUR JOB!!
わい
BUSTLE
GOT IT? NOW GET TO KNOW EACH OTHER.
LET ME KNOW IF SOMETHING COMES UP.
Y-YES, MA'AM...
わい
BUSTLE
わい
BUSTLE
NT 4201
AE 3803
...
しぽつーーん
AWKWARD
O2


NT 4201
AE 3803
IT-IT'S NICE TO MEET YOU...
LIKEWISE.
...SENPAI.
WOW, SHE'S SO COOL-HEADED...
WHY ARE YOU ACTING LIKE I'M THE BOSS?
?
わい HUSTLE
NT 4201
I'M YOUR KOHAI, RIGHT...?
OH!
ACK!
わい BUSTLE
THAT'S RIGHT!!
SH-SHE'S RIGHT... WHAT AM I DOING, CONFUSING MY KOHAI RIGHT OFF THE BAT?! I'M SO STUPID...!!
I'M THE SENPAI, SO I HAVE TO BE MORE ANCHORED! I HAVE TO LOOK LIKE I KNOW WHAT I'M DOING, OR I'LL MAKE THINGS HARDER FOR HER...!!
I AM THE SENPAI!!
ビシッ SNAP
RIGHT.


PULMONARY VEIN
CREPES
THEN...
...I-I'LL SHOW YOU EVERYTHING YOU NEED TO KNOW!!
わい HUSTLE
THANK YOU. I'M EXCITED TO LEARN.
わい BUSTLE
わい BUSTLE
カチーン STIFF
UH... LET ME... GET MY NOTES.
コチーン STIFF
わなわなわなわな SHAKE SHAKE SHAKE SHAKE
UM... ER...
S- SO...
バラ TMBL
バラ TMBL
AHEM.
AE 3803
LET'S START BY REVIEWING OUR DUTIES—
AH, YES—
VT 801
THE ROLES OF BLOOD: ①WATER RETENTION, ②GAS EXCHANGE, ③TRANSPORTATION OF NUTRIENTS, ④THERMO-REGULATION, ⑤DEFENDING THE BODY, AND ⑥REPAIRING WOUNDS.
OF THESE, THE CHIEF RESPONSIBILITY FOR US RED BLOOD CELLS IS GAS EXCHANGE, ISN'T IT?
ぺらぺらぺら BLAB BLAB BLAB
I LEARNED THAT ONCE WE DELIVER OXYGEN TO VARIOUS ORGANS, THE CELLS THERE BURN GLUCOSE TO CREATE ENERGY, CARBON DIOXIDE, AND WATER.
CARBON DIOXIDE IS HARMFUL TO THE BODY, SO IT NEEDS TO BE EXPELLED. THAT'S WHY WE CARRY IT TO THE ALVEOLI AND EXCHANGE IT FOR OXYGEN. I WAS TAUGHT THAT OUR JOB IS TO REPEAT THIS PROCESS, ALTHOUGH WE ALSO TRANSPORT NUTRIENTS ON THE SIDE.
ぺら BLAB BLAB
ぺら BLAB BLAB
ぺら BLAB

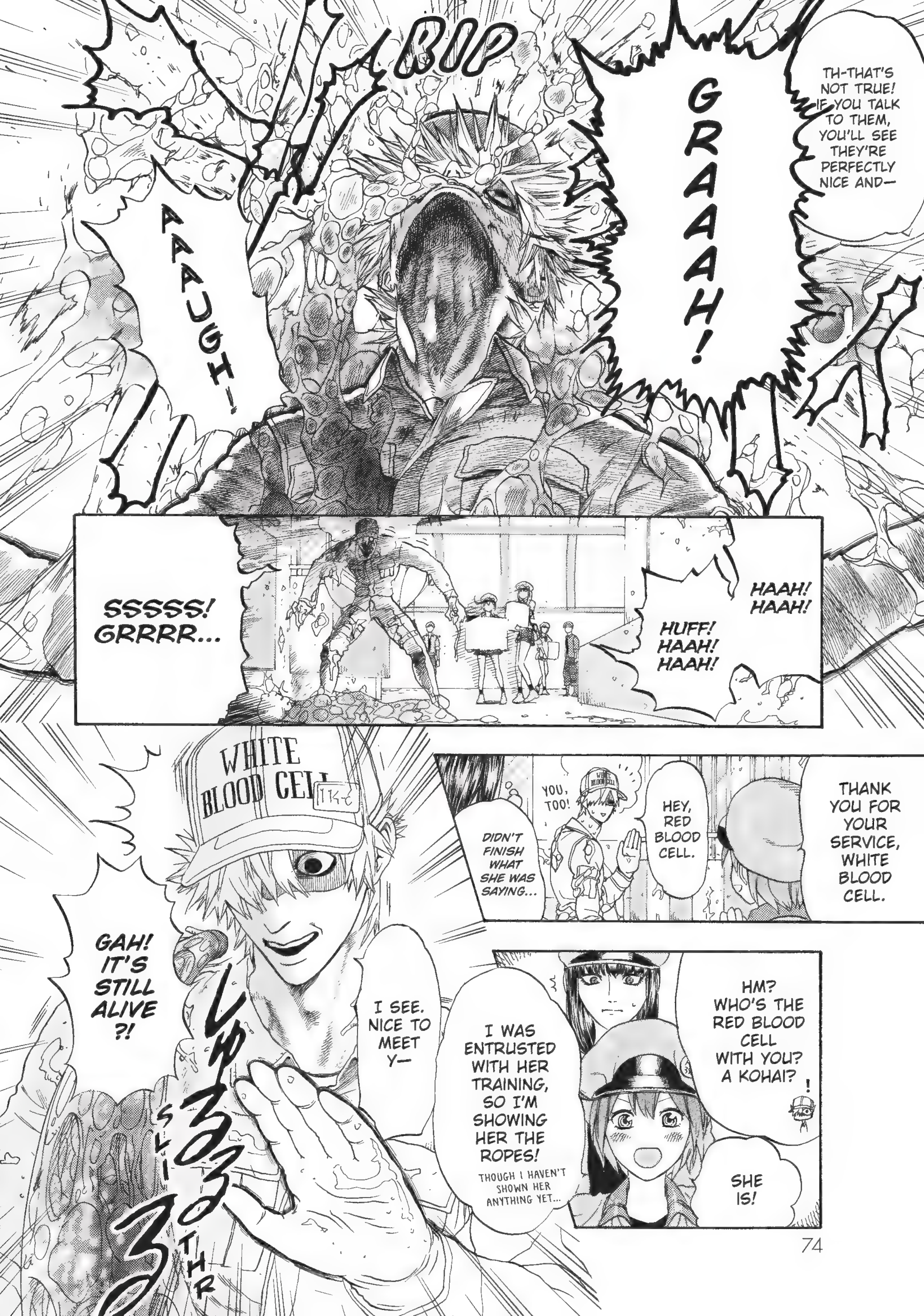

AND SO WE RED BLOOD CELLS PLAY AN ESSENTIAL ROLE IN MAINTAINING BIOLOGICAL ACTIVITY THROUGHOUT THE BODY. I'M SO HONORED TO BE ABLE TO DO SUCH IMPORTANT WORK.
WHAT AM I SUPPOSED TO TEACH THIS GIRL...?
NO—THIS WOMAN...?
ゴォォ
WHOOOOSH
OH, SO YOU ALREADY HAVE ALL THAT DOWN.
THEN LET'S START BY ACTUALLY CIRCULATING. EVEN IF THERE ARE THINGS YOU DON'T KNOW AT FIRST, IF YOU WORK HARD, YOU'LL GET IT EVENTUALLY!!
JUST DO YOUR BEST!
THAT... SOUNDS GOOD.
AORTA
AORTA
しーん
SILENCE
OH? SO WHAT SHOULD WE...
...TALK ABOUT NOW?
ABOUT OURSELVES?
ARTERY
ARTERY
UH, SO NOW WE TURN... RIGHT?
MAYBE THAT WAY?
ガヤ
CHATTER
ガヤ
CHATTER
NT 4201
...
SHE SHOULD HAVE SAVED THE EXPLANATION OF THE JOB FOR THE ROAD.
SHE'S NOT EXACTLY GREAT AT THIS...
YO!! THIS IS A LYMPH DUCT!! AIN'T NO PLACE FOR RED BLOOD CELL BRATS!!
ビクッ
JOLT
EEEEEEEK!!
M-MY MISTAKE!!!

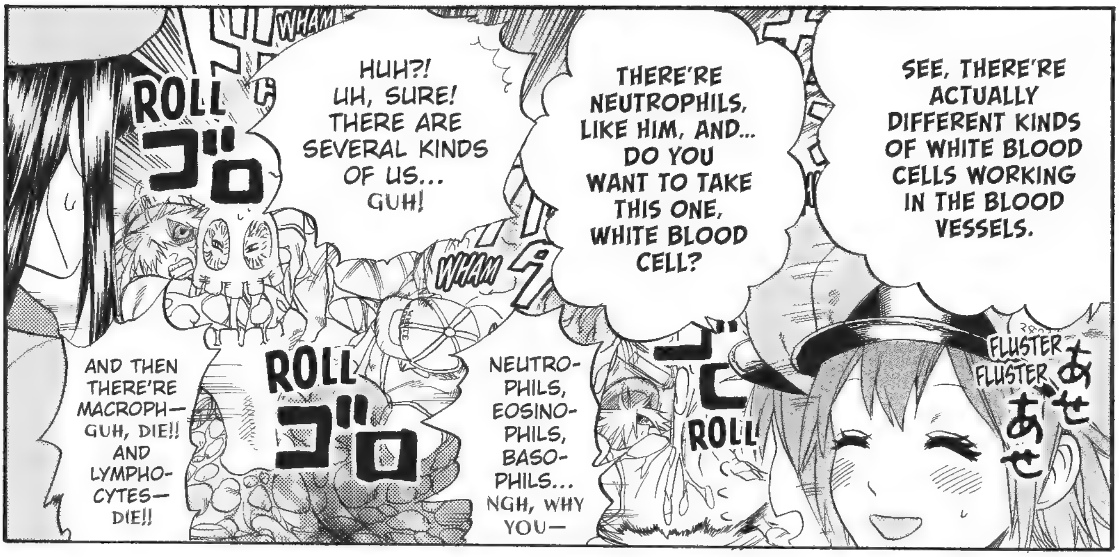
**Killer T Cells (Cytotoxic T Cells)**
Professional killers who destroy virus-infected cells, cancer cells, and others. They are found primarily in the lymphatic system.

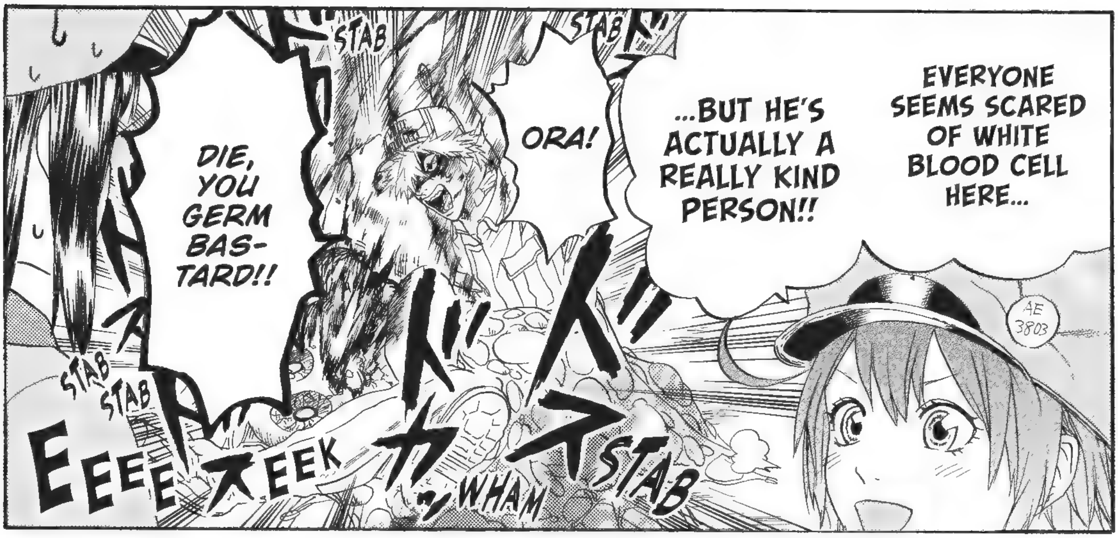

BOY, THAT WAS SCARY... SORRY TO PUT YOU THROUGH THAT.
OH... IT'S FINE.
I MAKE MISTAKES LIKE THAT A LOT.
I'M SUCH A DUMMY...
I JUST THINK THAT PERSON DIDN'T NEED TO BE SO AGGRESSIVE, AND THAT DOES BOTHER ME A BIT...
GETTING YELLED AT LIKE THAT ISN'T PART OF OUR JOB, YOU KNOW.
...? UH... SURE, I MEAN...
YAARRR
HM?
OH, IT'S WHITE BLOOD CELL.
EEP!
ORA ORA ORA!
GRRRRR
TACKLE
DIE! DIIIE!
HUH...?! SENPAI, YOU KNOW AN IMMUNE CELL?
MM-HMM. THEY'RE ALL GOOD PEOPLE!
AAARRR
WHAT ARE YOU TALKING ABOUT...? NEUTROPHILS CONFLATE JUSTICE WITH VIOLENCE. THEY'RE WALKING CONTRADICTIONS.
GRRRRR
SCREE! SCREE!

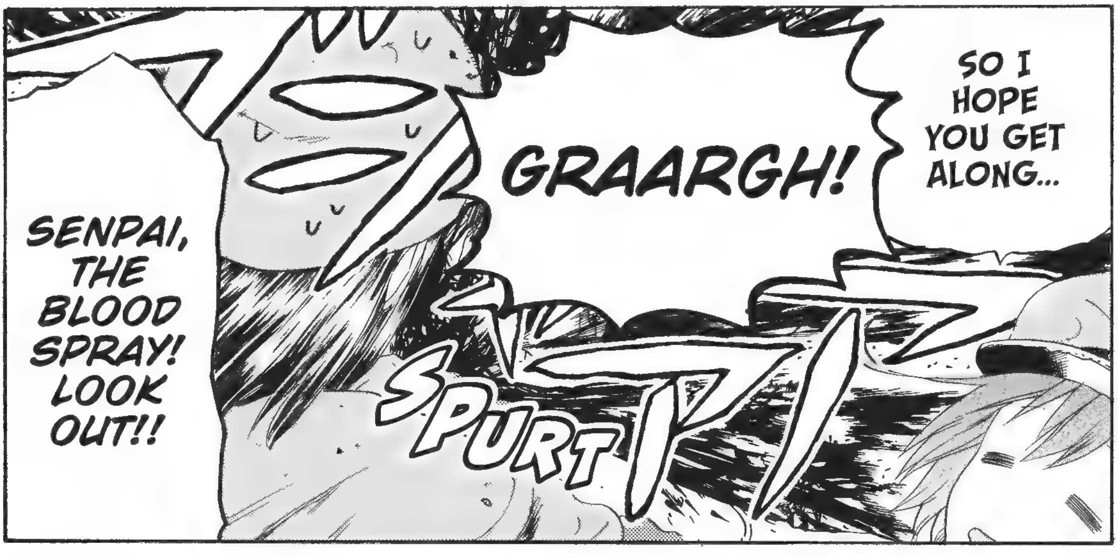
**White Blood Cell (Neutrophil)**
His main job is to destroy foreign substances that enter the body from the outside, such as bacteria and viruses.

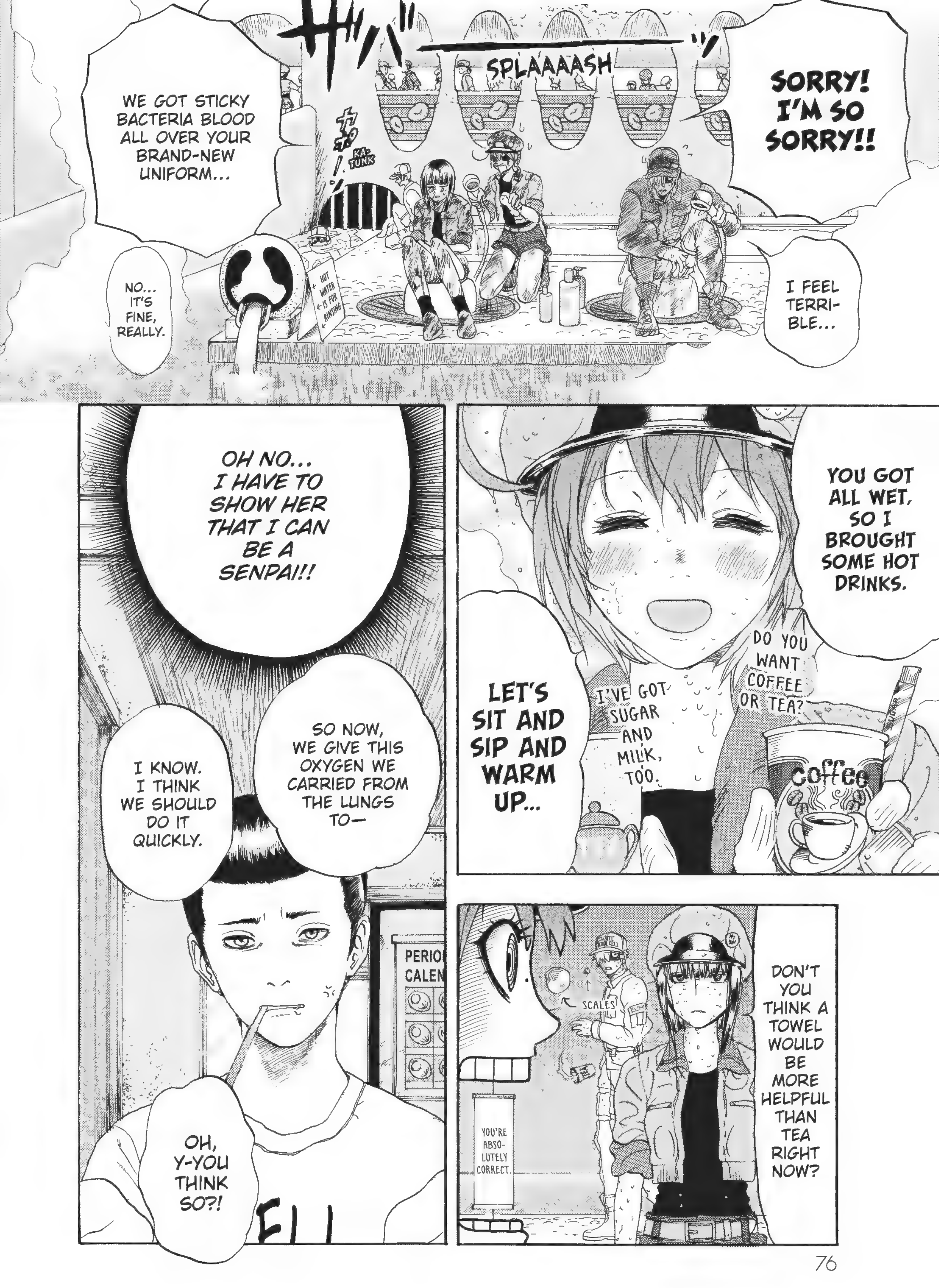
**Streptococcus Mutans**
A bacterium that lives in the mouth, and one of several responsible for tooth cavities.

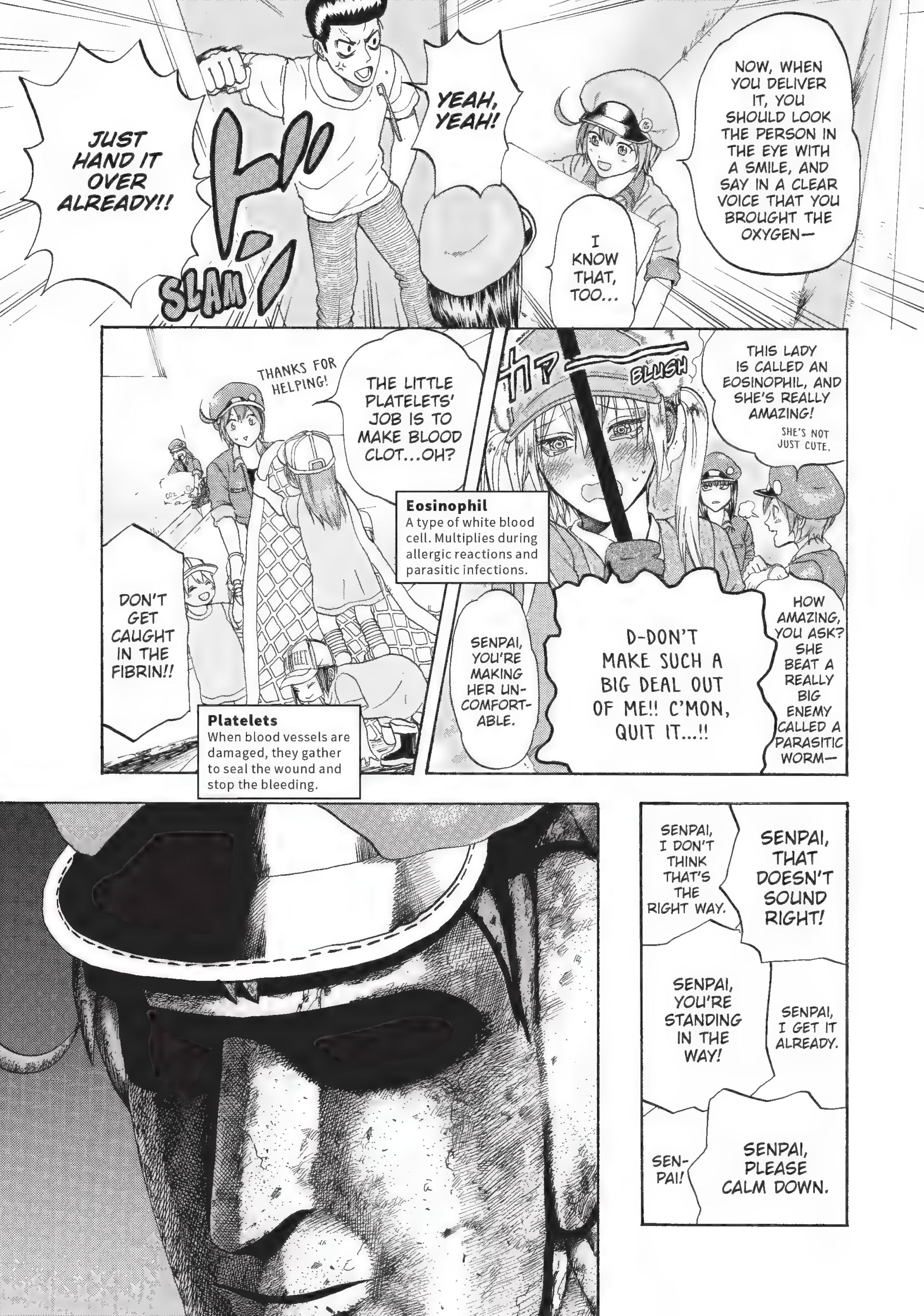

TH-THAT'S NOT TRUE! IF YOU TALK TO THEM, YOU'LL SEE THEY'RE PERFECTLY NICE AND—
RIP
GRAAAAH!
PAAAUGH!
HAAH! HAAH!
HUFF! HAAH! HAAH!
SSSSS! GRRRR...
THANK YOU FOR YOUR SERVICE, WHITE BLOOD CELL.
HEY, RED BLOOD CELL.
YOU, TOO!
DIDN'T FINISH WHAT SHE WAS SAYING...
WHITE BLOOD CELL 1146
HM? WHO'S THE RED BLOOD CELL WITH YOU? A KOHAI?
!
SHE IS!
I WAS ENTRUSTED WITH HER TRAINING, SO I'M SHOWING HER THE ROPES!
THOUGH I HAVEN'T SHOWN HER ANYTHING YET...
I SEE. NICE TO MEET Y—
GAH! IT'S STILL ALIVE?!
SLITHR


SEE, THERE'RE ACTUALLY DIFFERENT KINDS OF WHITE BLOOD CELLS WORKING IN THE BLOOD VESSELS.
FLUSTER FLUSTER あせあせ
THERE'RE NEUTROPHILS, LIKE HIM, AND... DO YOU WANT TO TAKE THIS ONE, WHITE BLOOD CELL?
ROLL
HUH?! UH, SURE! THERE ARE SEVERAL KINDS OF US... GUH!
WHAM
NEUTROPHILS, EOSINOPHILS, BASOPHILS... NGH, WHY YOU—
ROLL ゴロ
WHAM
ROLL ゴロ
AND THEN THERE'RE MACROPH— GUH, DIE!! AND LYMPHOCYTES— DIE!!


EVERYONE SEEMS SCARED OF WHITE BLOOD CELL HERE...
AE 3803
...BUT HE'S ACTUALLY A REALLY KIND PERSON!!
ORA!
STAB
STAB
DIE, YOU GERM BASTARD!!
ドスッ
STAB
カッ
WHAM
EEEEEEEK
STAB STAB


SO I HOPE YOU GET ALONG...
GRAARGH!
SPURT
SENPAI, THE BLOOD SPRAY! LOOK OUT!!

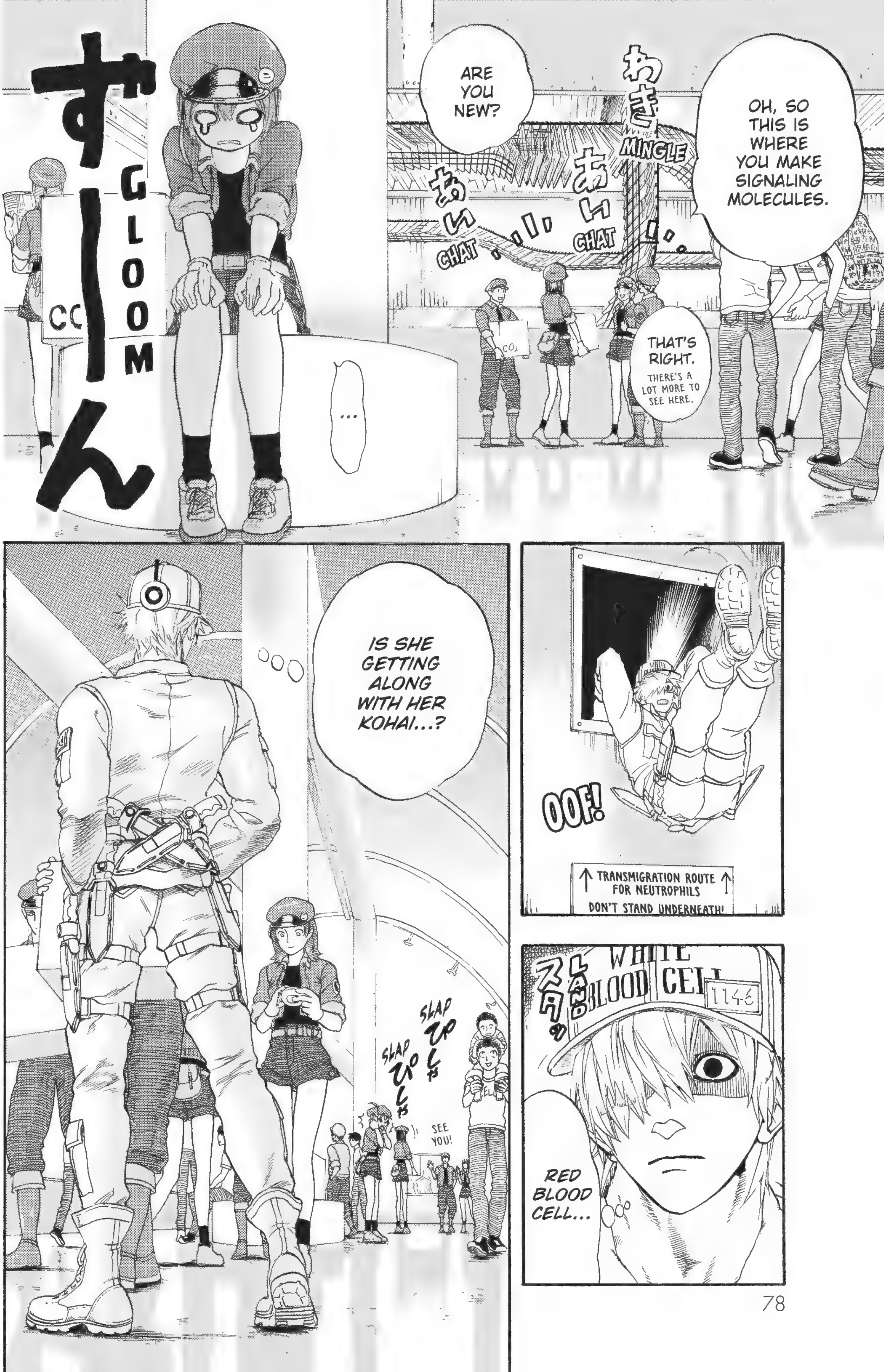

SPLAAAASH
SORRY! I'M SO SORRY!!
I FEEL TERRIBLE...
KA-TUNK
WE GOT STICKY BACTERIA BLOOD ALL OVER YOUR BRAND-NEW UNIFORM...
NO... IT'S FINE, REALLY.
HOT WATER IS FOR RINSING
YOU GOT ALL WET, SO I BROUGHT SOME HOT DRINKS.
DO YOU WANT COFFEE OR TEA?
I'VE GOT SUGAR AND MILK, TOO.
LET'S SIT AND SIP AND WARM UP...
Coffee
SUGAR
DON'T YOU THINK A TOWEL WOULD BE MORE HELPFUL THAN TEA RIGHT NOW?
SCALES
YOU'RE ABSOLUTELY CORRECT.
OH NO... I HAVE TO SHOW HER THAT I CAN BE A SENPAI!!
SO NOW, WE GIVE THIS OXYGEN WE CARRIED FROM THE LUNGS TO—
I KNOW. I THINK WE SHOULD DO IT QUICKLY.
PERIO
CALEN
OH, Y-YOU THINK SO?!

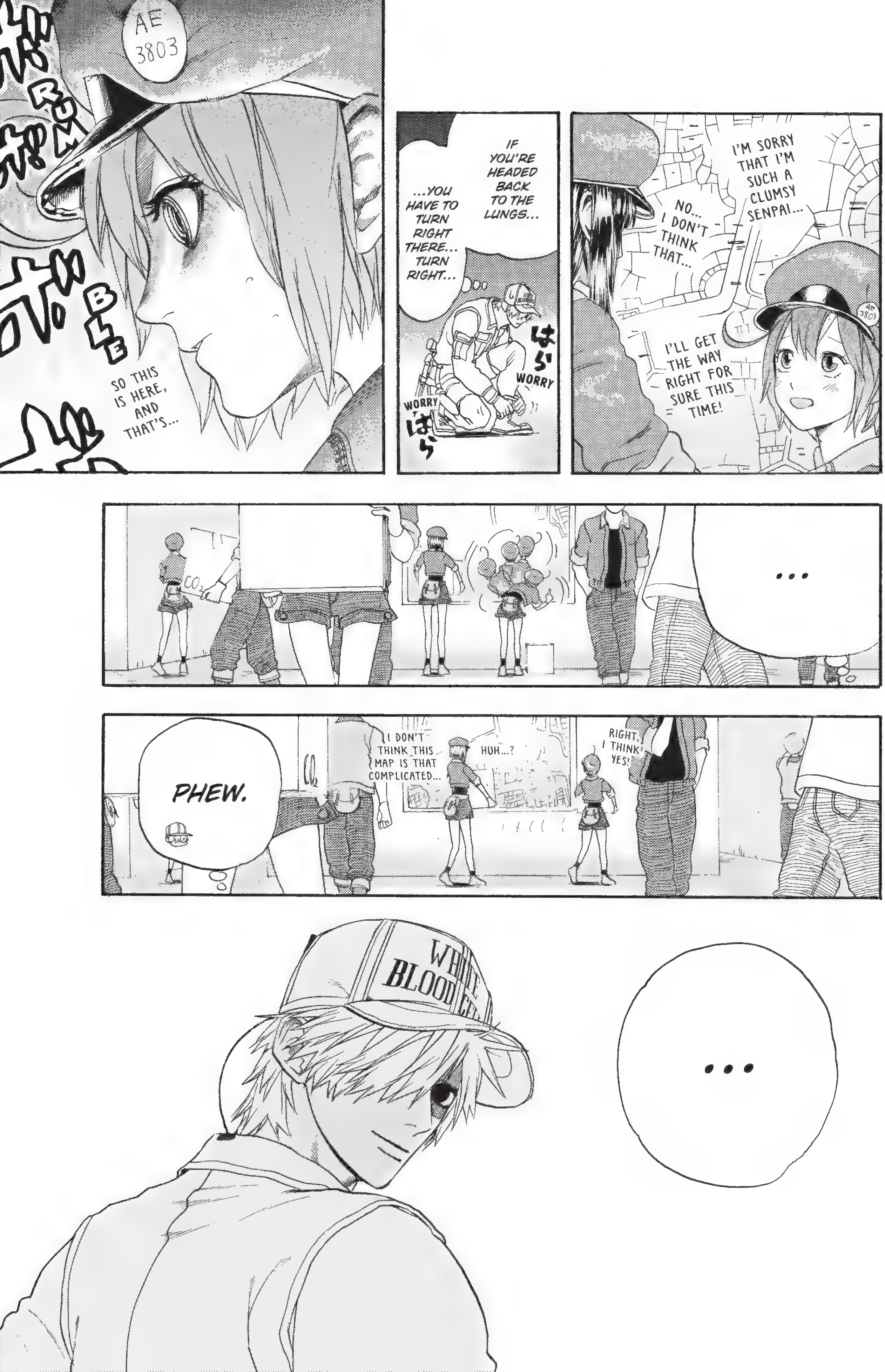


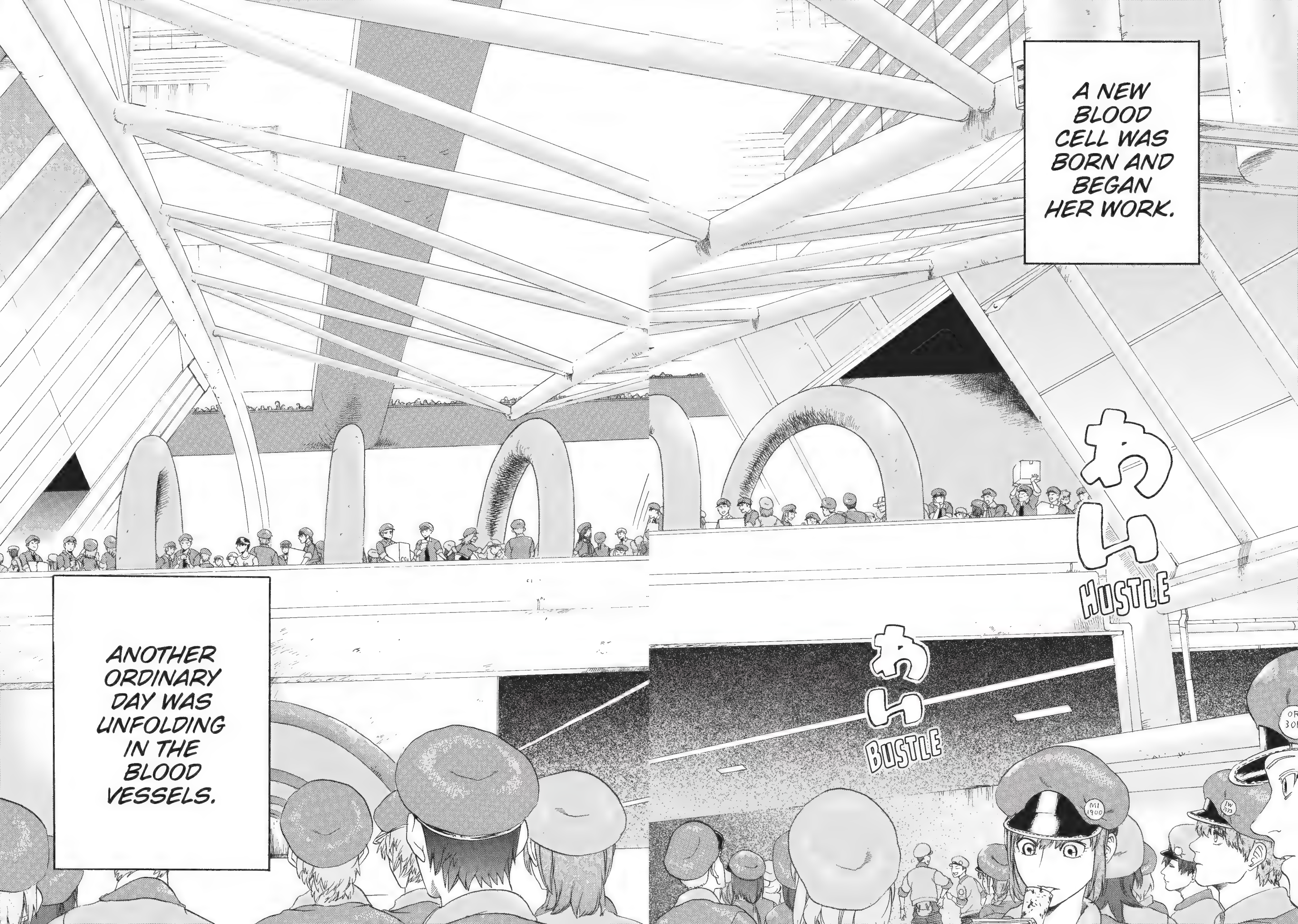
NOW, WHEN YOU DELIVER IT, YOU SHOULD LOOK THE PERSON IN THE EYE WITH A SMILE, AND SAY IN A CLEAR VOICE THAT YOU BROUGHT THE OXYGEN—
I KNOW THAT, TOO...
YEAH, YEAH!
SLAM
JUST HAND IT OVER ALREADY!!
THIS LADY IS CALLED AN EOSINOPHIL, AND SHE'S REALLY AMAZING!
SHE'S NOT JUST CUTE.
カァー
BLUSH
HOW AMAZING, YOU ASK? SHE BEAT A REALLY BIG ENEMY CALLED A PARASITIC WORM—
D-DON'T MAKE SUCH A BIG DEAL OUT OF ME!! C'MON, QUIT IT...!!
SENPAI, YOU'RE MAKING HER UNCOMFORTABLE.
THE LITTLE PLATELETS' JOB IS TO MAKE BLOOD CLOT...OH?
THANKS FOR HELPING!
DON'T GET CAUGHT IN THE FIBRIN!!
SENPAI, THAT DOESN'T SOUND RIGHT!
SENPAI, I DON'T THINK THAT'S THE RIGHT WAY.
SENPAI, I GET IT ALREADY.
SENPAI, YOU'RE STANDING IN THE WAY!
SENPAI, PLEASE CALM DOWN.
SEN-PAI!

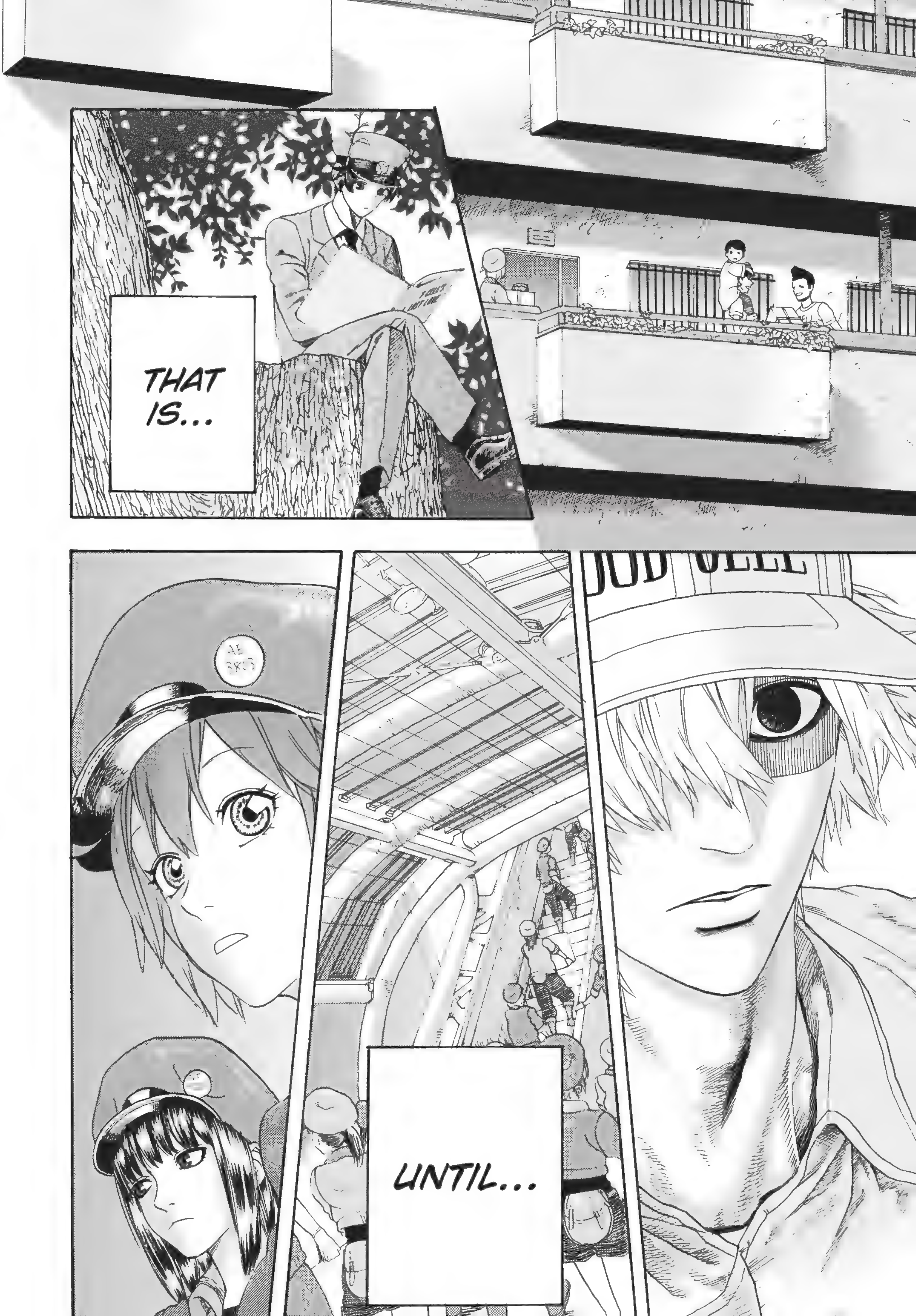
**Eosinophil**
A type of white blood cell. Multiplies during allergic reactions and parasitic infections.

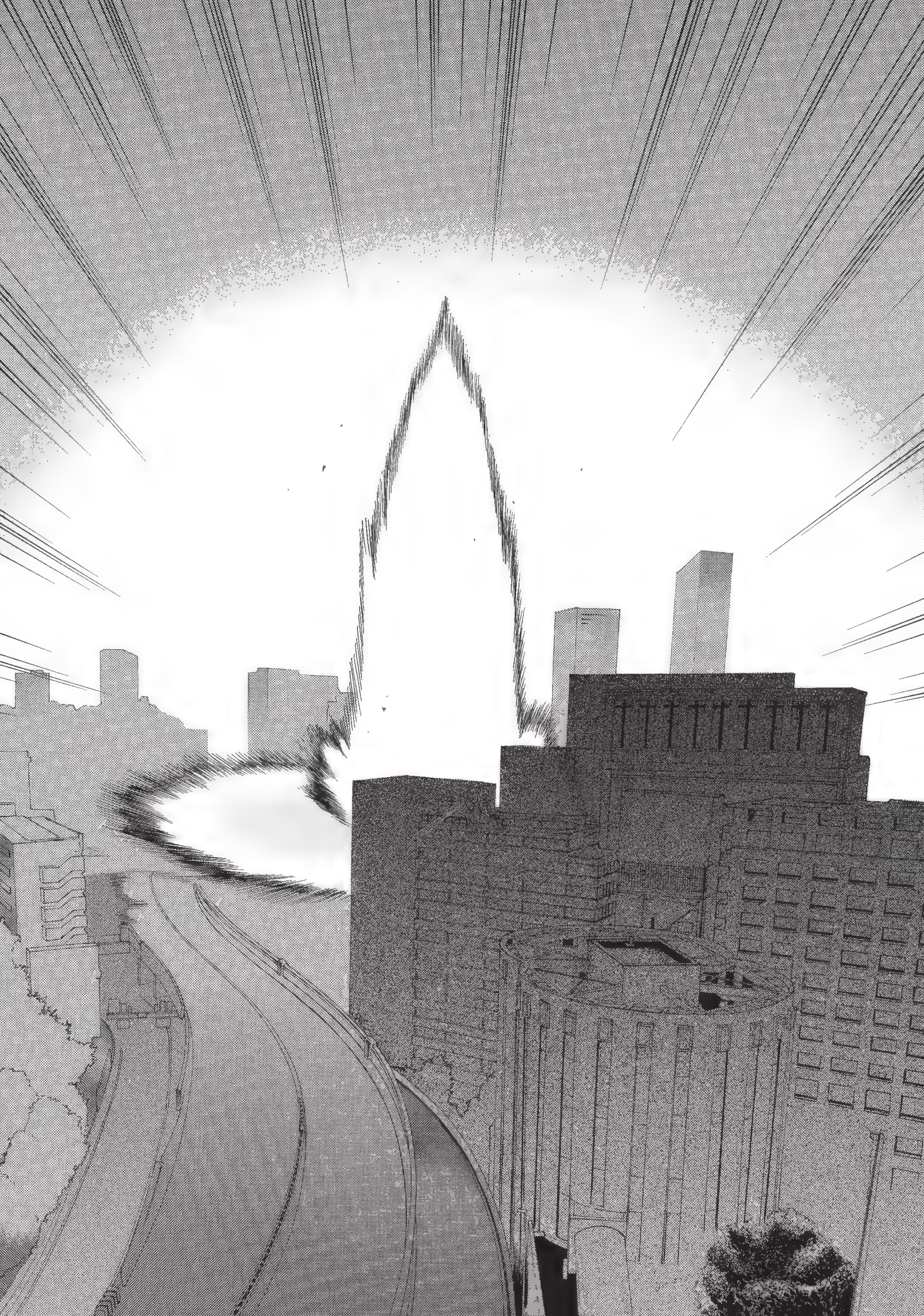
**Platelets**
When blood vessels are damaged, they gather to seal the wound and stop the bleeding.

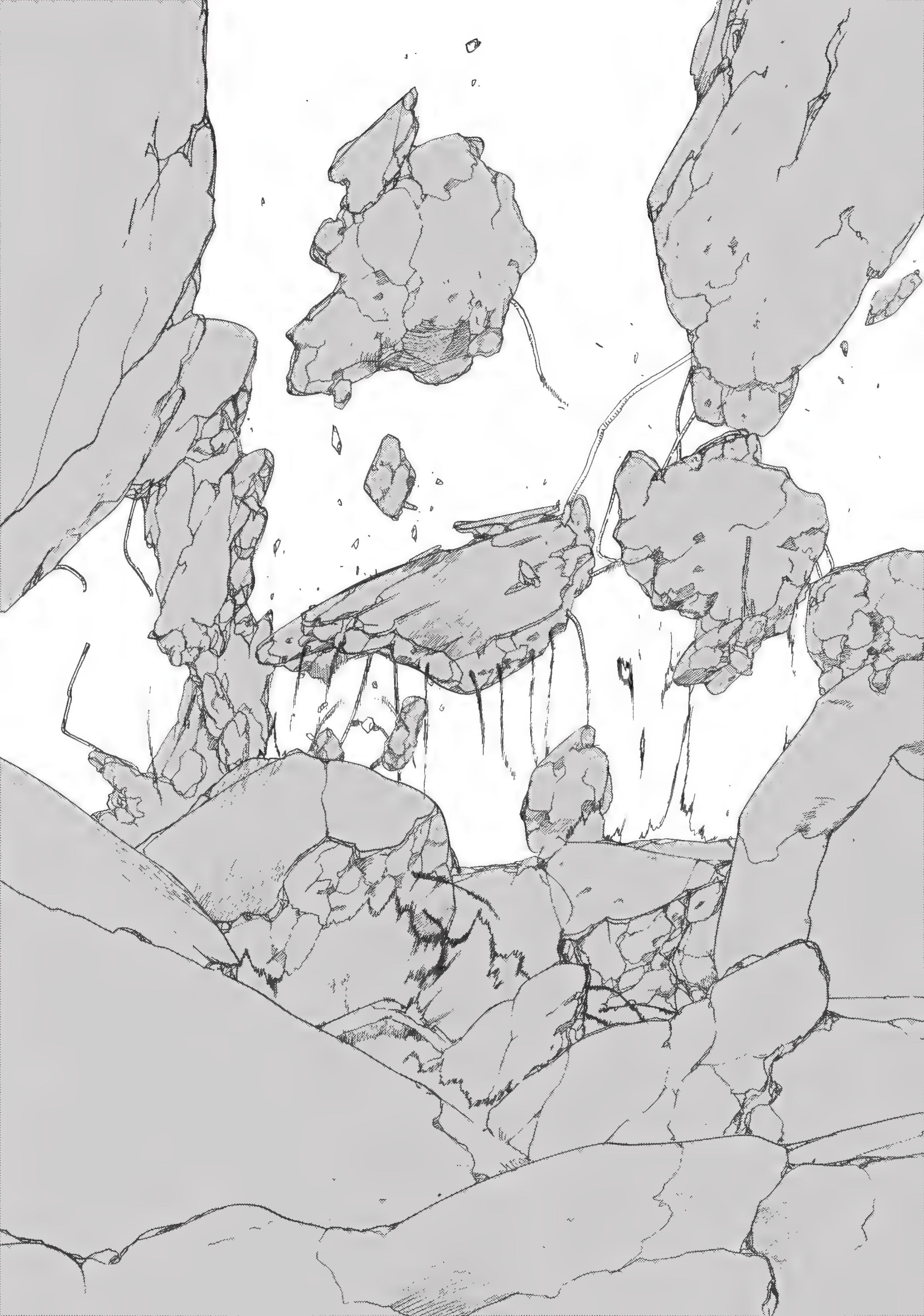

OH, SO THIS IS WHERE YOU MAKE SIGNALING MOLECULES.
THAT'S RIGHT. THERE'S A LOT MORE TO SEE HERE.
わき MINGLE
あい CHAT
あい CHAT
ARE YOU NEW?
CO2
…
ずーん GLOOM
CO
OOF!
↑ TRANSMIGRATION ROUTE FOR NEUTROPHILS ↑
DON'T STAND UNDERNEATH!
WHITE BLOOD CELL 1146
スタッ LAND
RED BLOOD CELL…
IS SHE GETTING ALONG WITH HER KOHAI…?
ぴしっ SLAP
ぴしっ SLAP
SEE YOU!


I'M SORRY THAT I'M SUCH A CLUMSY SENPAI...
NO... I DON'T THINK THAT...
AE 3803
I'LL GET THE WAY RIGHT FOR SURE THIS TIME!
IF YOU'RE HEADED BACK TO THE LUNGS...
...YOU HAVE TO TURN RIGHT THERE... TURN RIGHT...
はら WORRY
WORRY はら
AE 3803
RUMBLE
SO THIS IS HERE, AND THAT'S...
CO2
...
RIGHT, I THINK! YES!
HUH...?
I DON'T THINK THIS MAP IS THAT COMPLICATED...
PHEW.
WHITE BLOOD CELL
...


A NEW BLOOD CELL WAS BORN AND BEGAN HER WORK.
わい
HUSTLE
わい
BUSTLE
MI 1900
ANOTHER ORDINARY DAY WAS UNFOLDING IN THE BLOOD VESSELS.


THAT IS...
T CELL'S HOT LINE
AE3803
OOD CELL
UNTIL...





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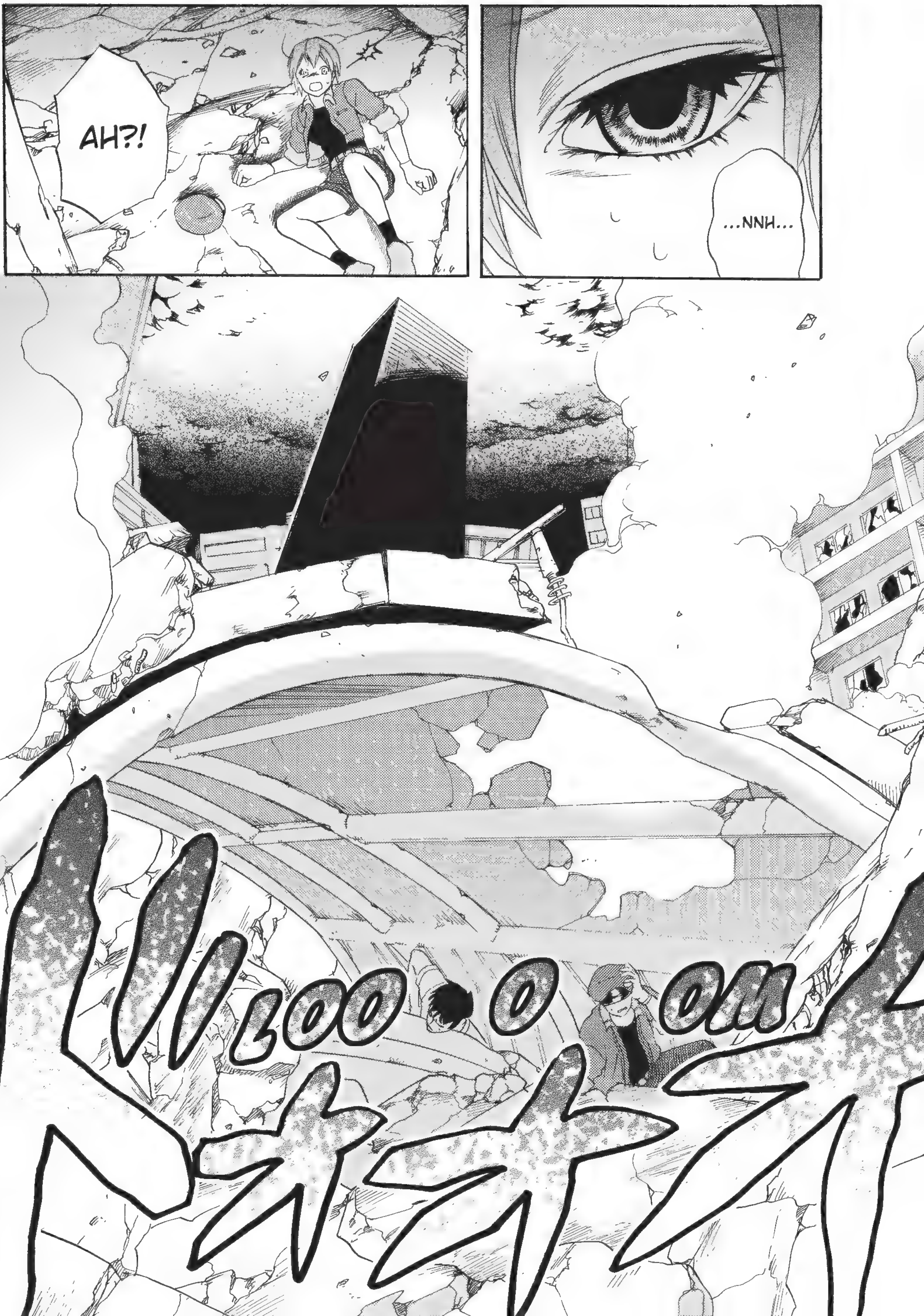
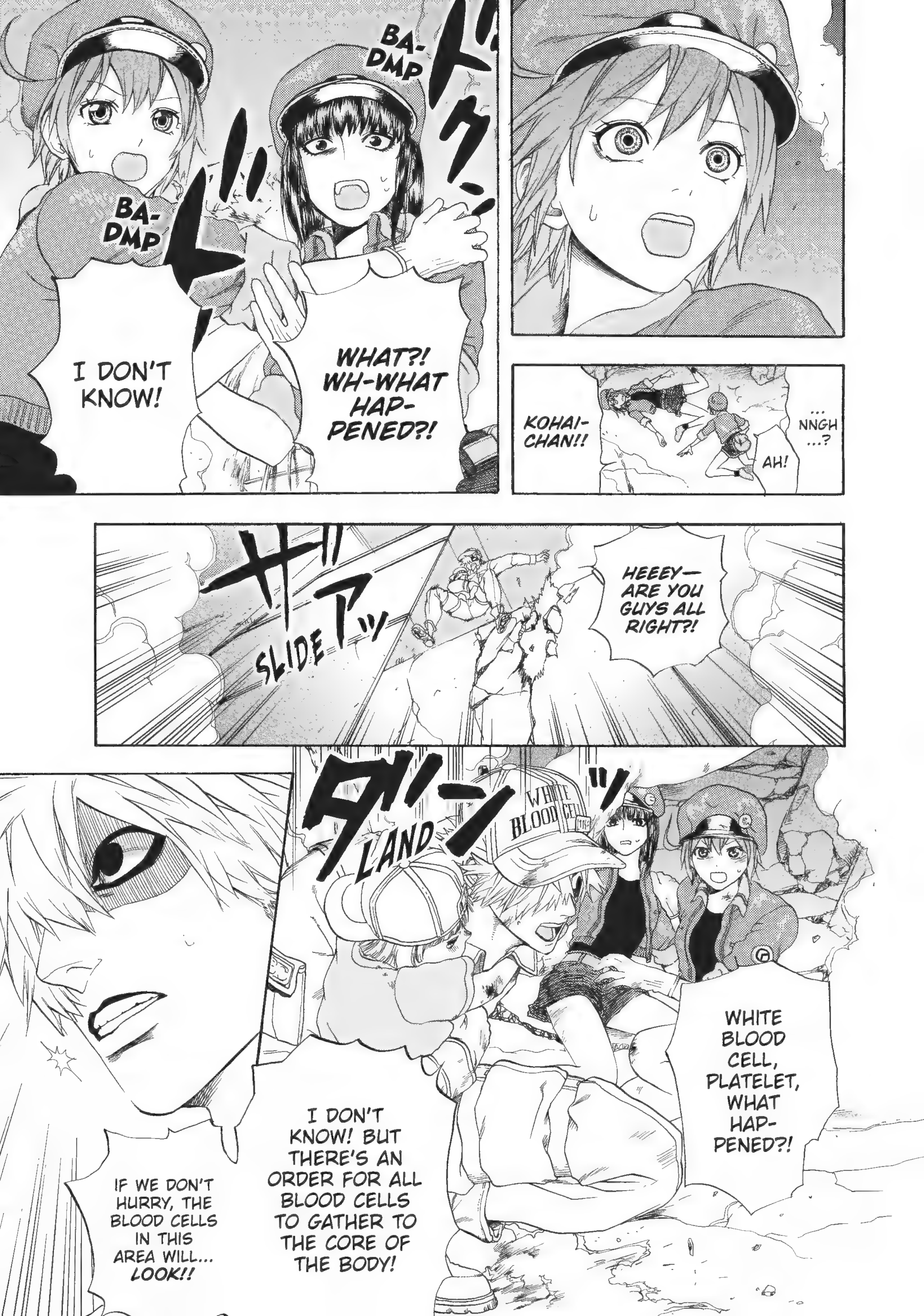
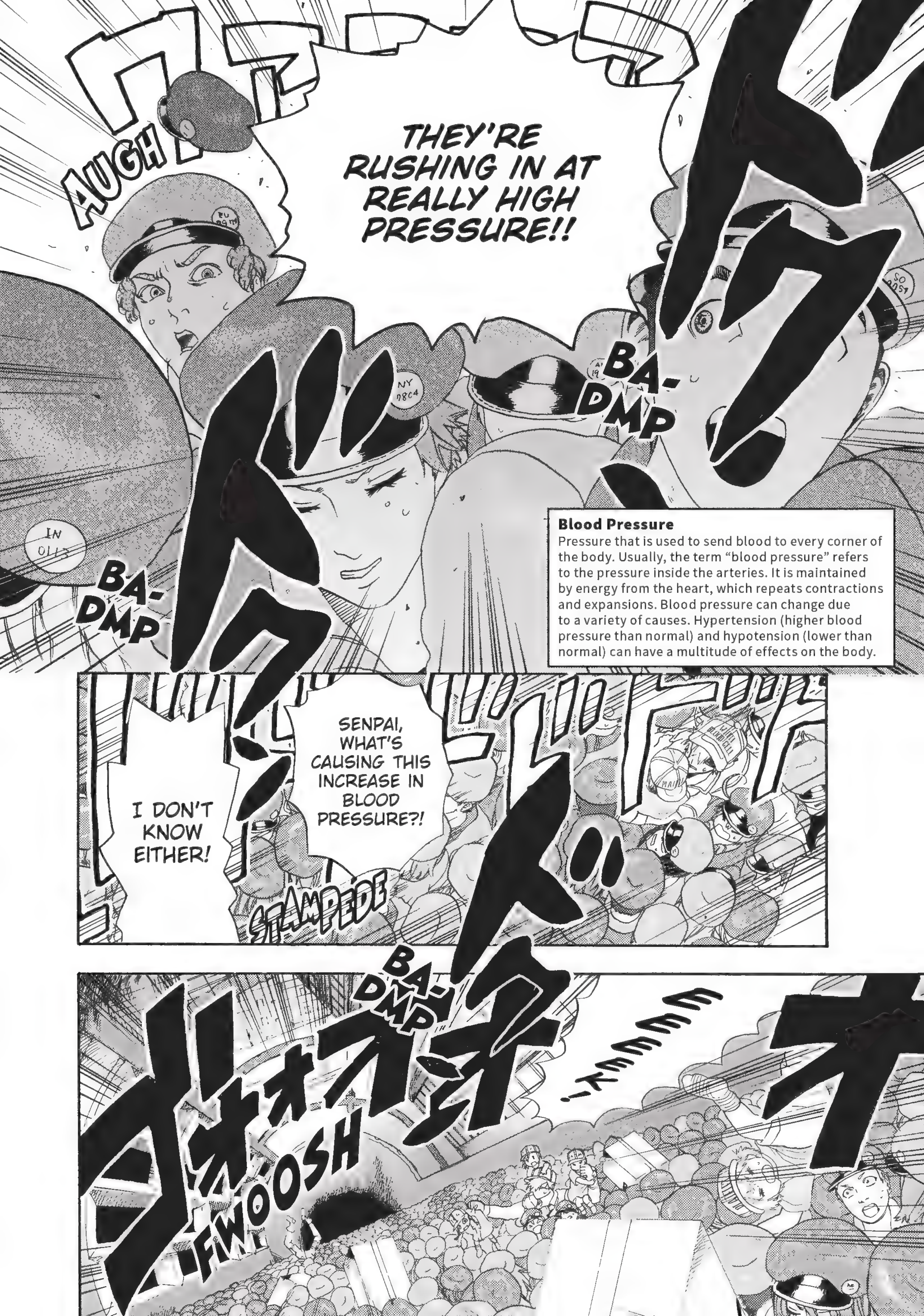
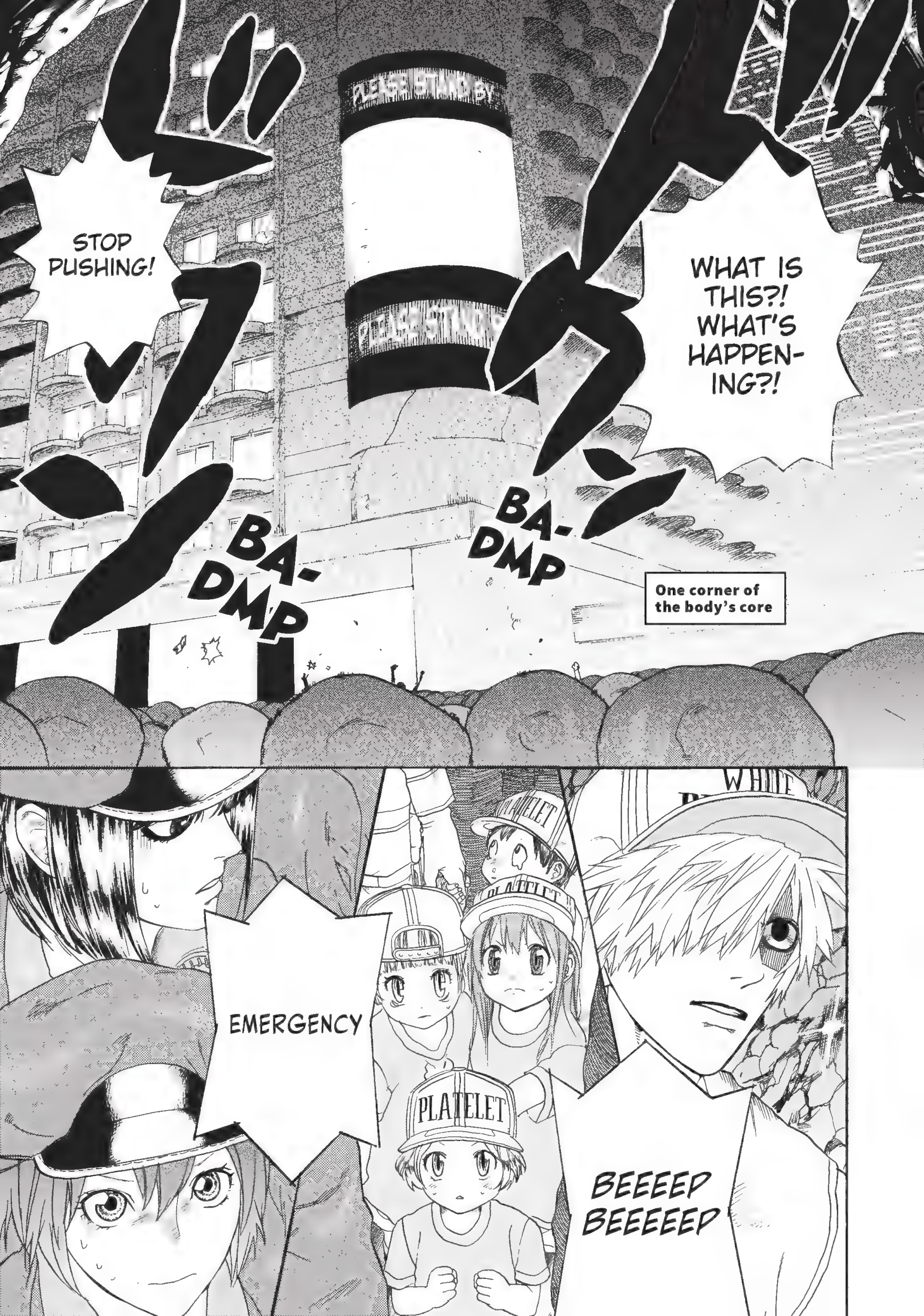
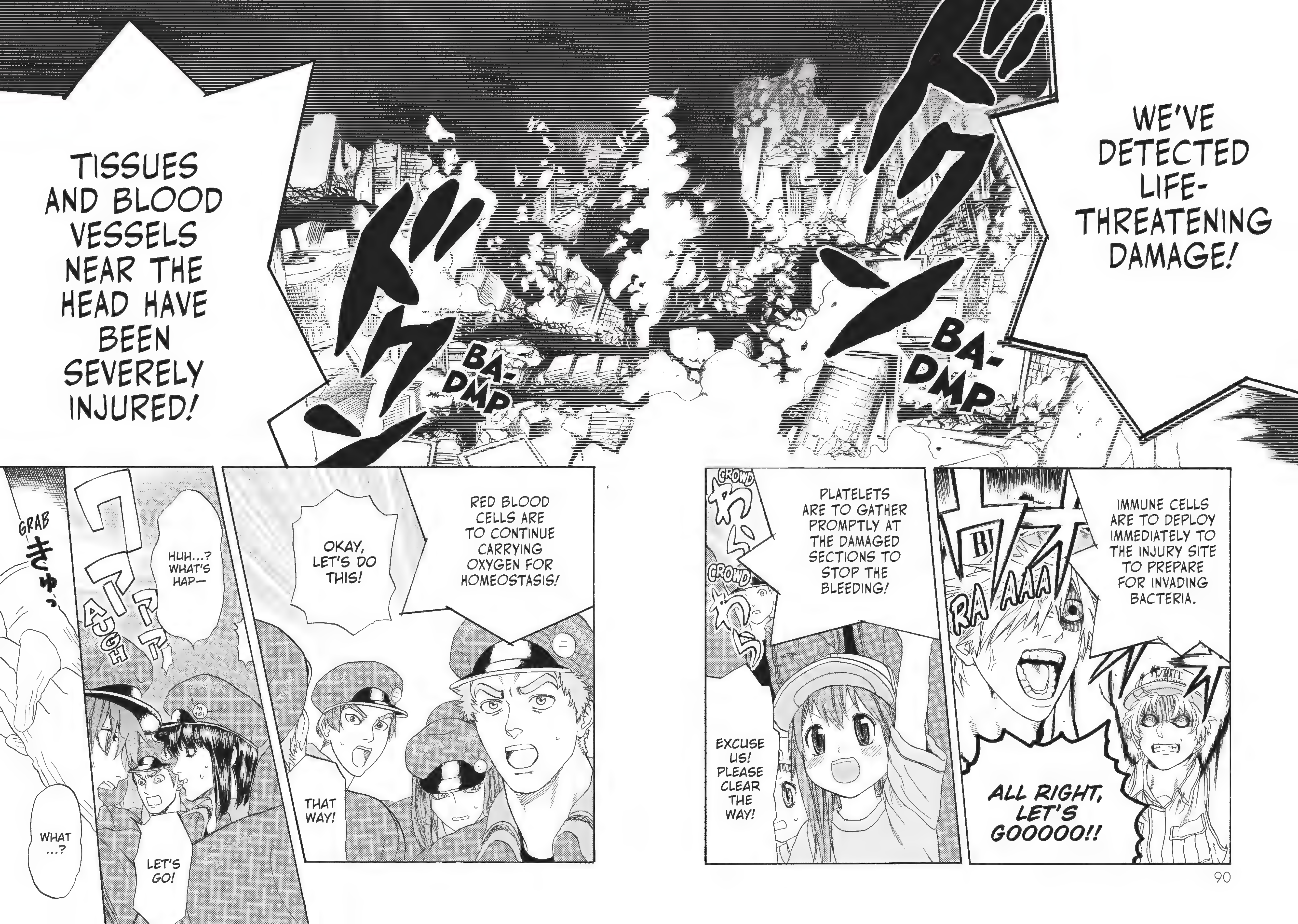

...NNH...
AH?!
LOO•O•OM
ドオオオ

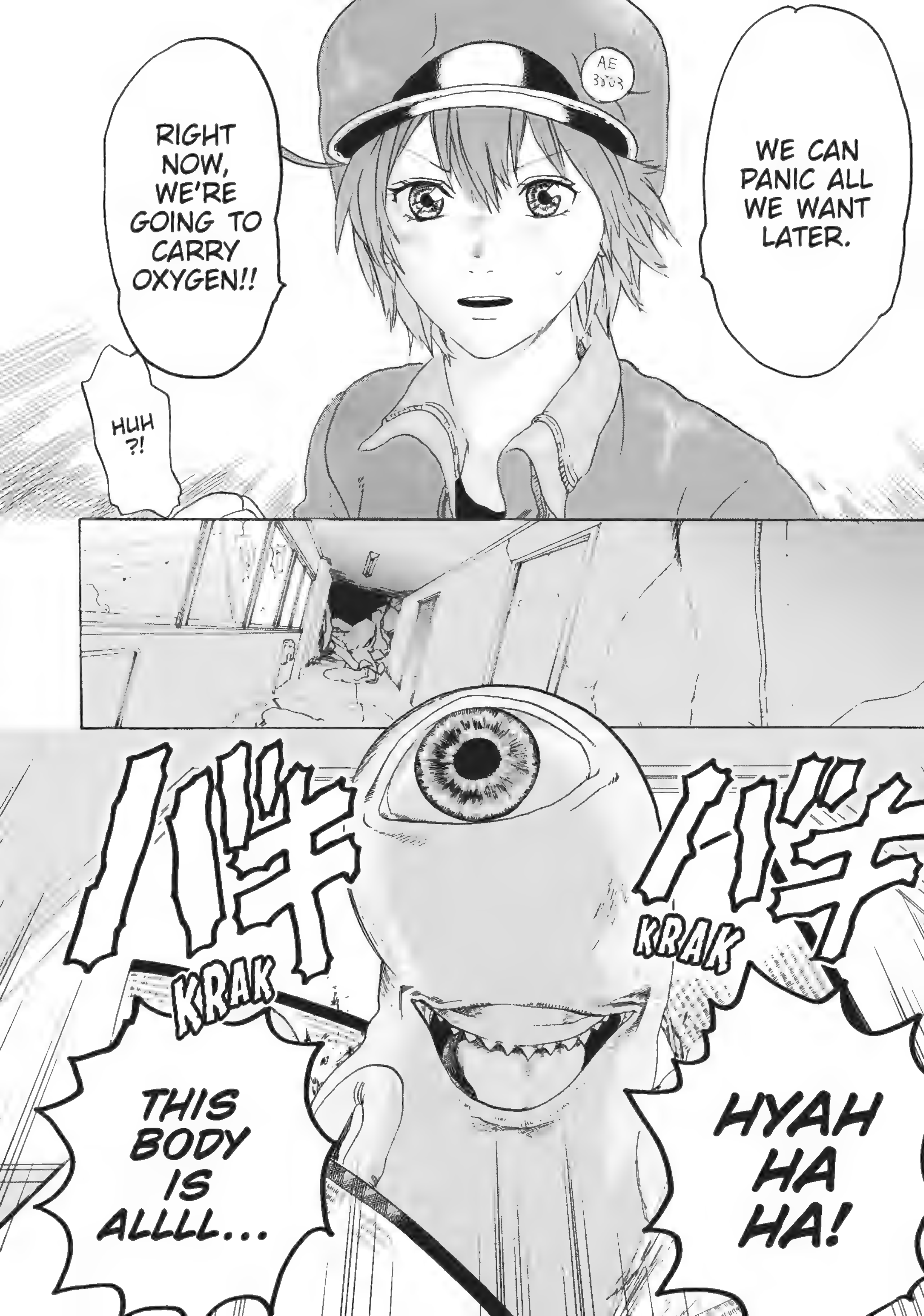

BA-DMP
BA-DMP
WHAT?! WH-WHAT HAP-PENED?!
I DON'T KNOW!
...NNGH ...?
AH!
KOHAI-CHAN!!
HEEEY— ARE YOU GUYS ALL RIGHT?!
SLIDE
LAND
WHITE BLOOD CELL
WHITE BLOOD CELL, PLATELET, WHAT HAP-PENED?!
I DON'T KNOW! BUT THERE'S AN ORDER FOR ALL BLOOD CELLS TO GATHER TO THE CORE OF THE BODY!
IF WE DON'T HURRY, THE BLOOD CELLS IN THIS AREA WILL... LOOK!!

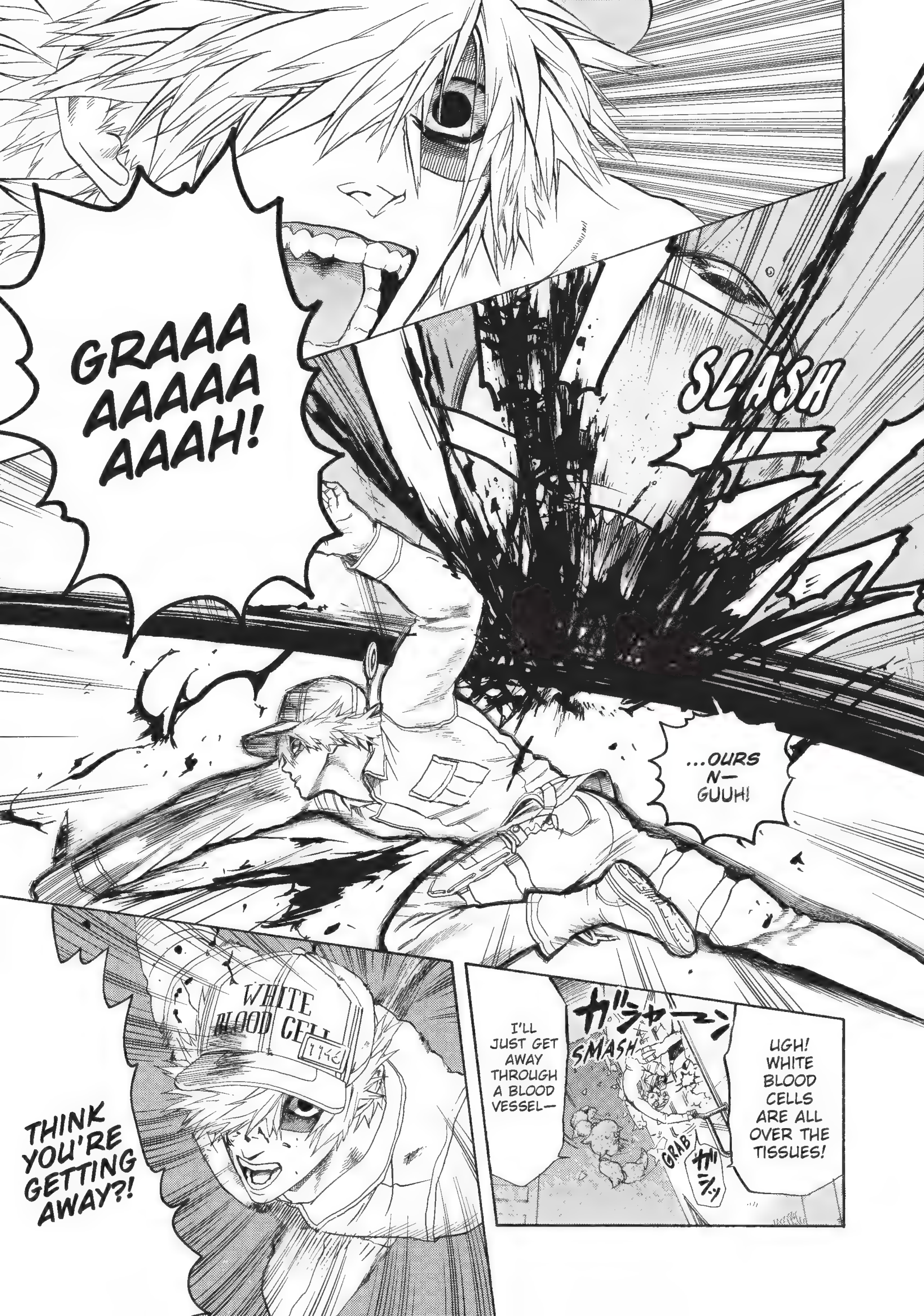

THEY'RE RUSHING IN AT REALLY HIGH PRESSURE!!
AUGH
BA-DMP
BA-DMP
SENPAI, WHAT'S CAUSING THIS INCREASE IN BLOOD PRESSURE?!
I DON'T KNOW EITHER!
STAMPEDE
BA-DMP
EEEEEK!
FWOOSH

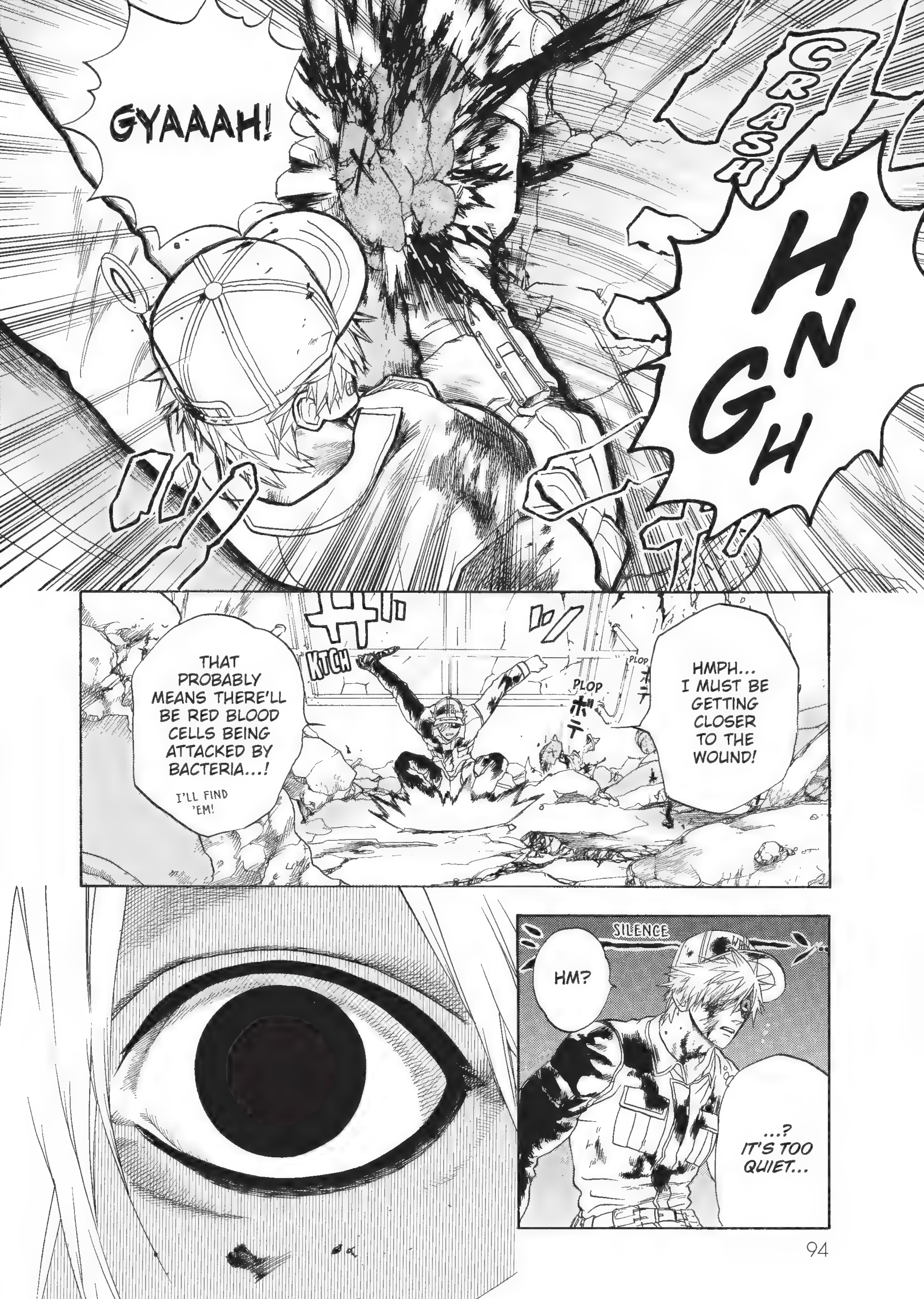
**Blood Pressure**
Pressure that is used to send blood to every corner of the body. Usually, the term "blood pressure" refers to the pressure inside the arteries. It is maintained by energy from the heart, which repeats contractions and expansions. Blood pressure can change due to a variety of causes. Hypertension (higher blood pressure than normal) and hypotension (lower than normal) can have a multitude of effects on the body.

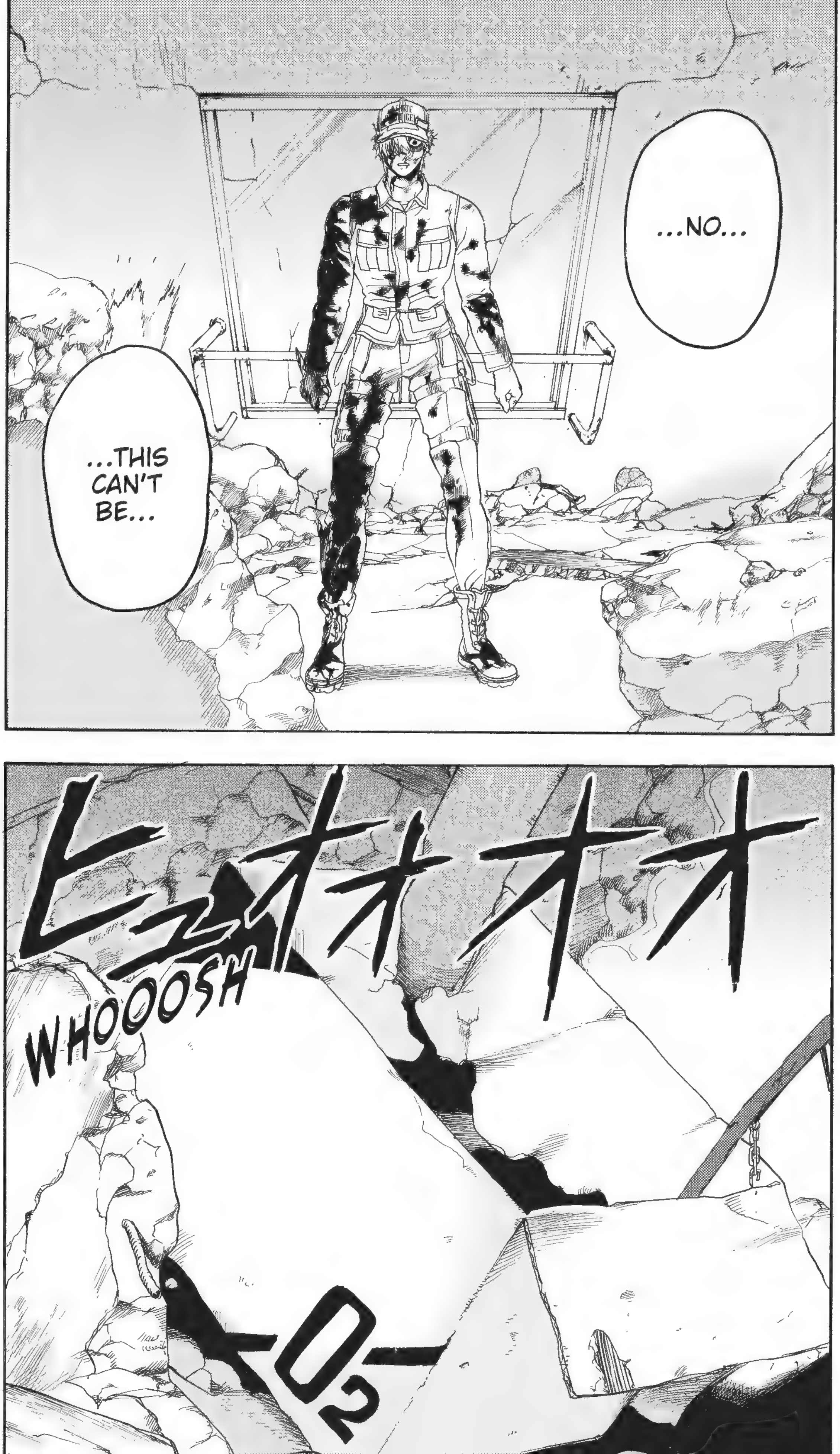

WHAT IS THIS?! WHAT'S HAPPENING?!
STOP PUSHING!
PLEASE STAND BY
PLEASE STAND BY
BA-DMP
BA-DMP
One corner of the body's core
WHITE
PLATELET
PLATELET
EMERGENCY
PLATELET
BEEEEP BEEEEEP

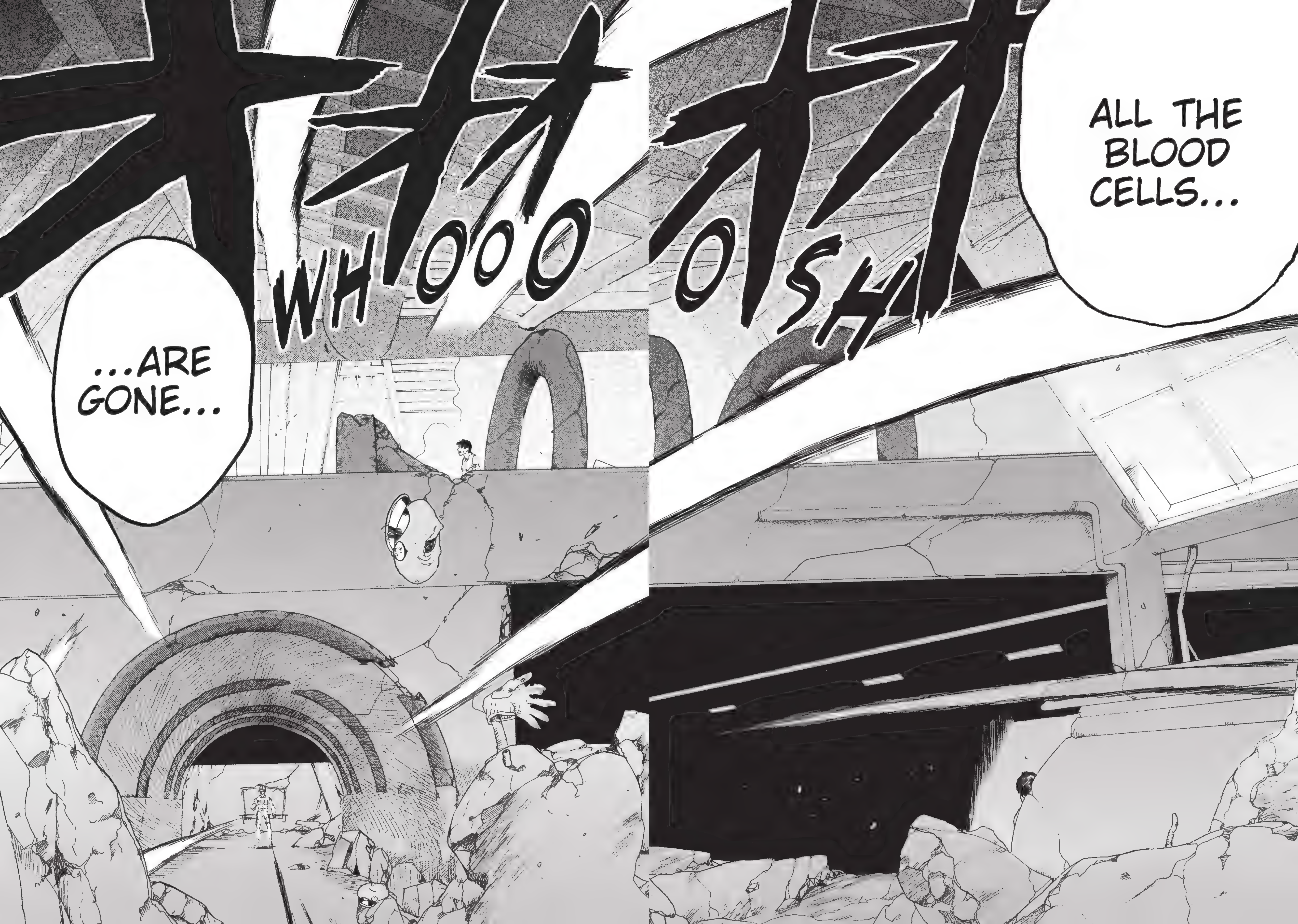

WE'VE DETECTED LIFE-THREATENING DAMAGE!
ドクン
BA-DMP
TISSUES AND BLOOD VESSELS NEAR THE HEAD HAVE BEEN SEVERELY INJURED!
ドクン
BA-DMP
IMMUNE CELLS ARE TO DEPLOY IMMEDIATELY TO THE INJURY SITE TO PREPARE FOR INVADING BACTERIA.
ウオオ
RAAAA
ALL RIGHT, LET'S GOOOOO!!
PLATELETS ARE TO GATHER PROMPTLY AT THE DAMAGED SECTIONS TO STOP THE BLEEDING!
CROWD わら
CROWD わら
EXCUSE US! PLEASE CLEAR THE WAY!
RED BLOOD CELLS ARE TO CONTINUE CARRYING OXYGEN FOR HOMEOSTASIS!
OKAY, LET'S DO THIS!
THAT WAY!
HUH...? WHAT'S HAP—
AUGH アァ
GRAB きゅっ
WHAT...?
LET'S GO!

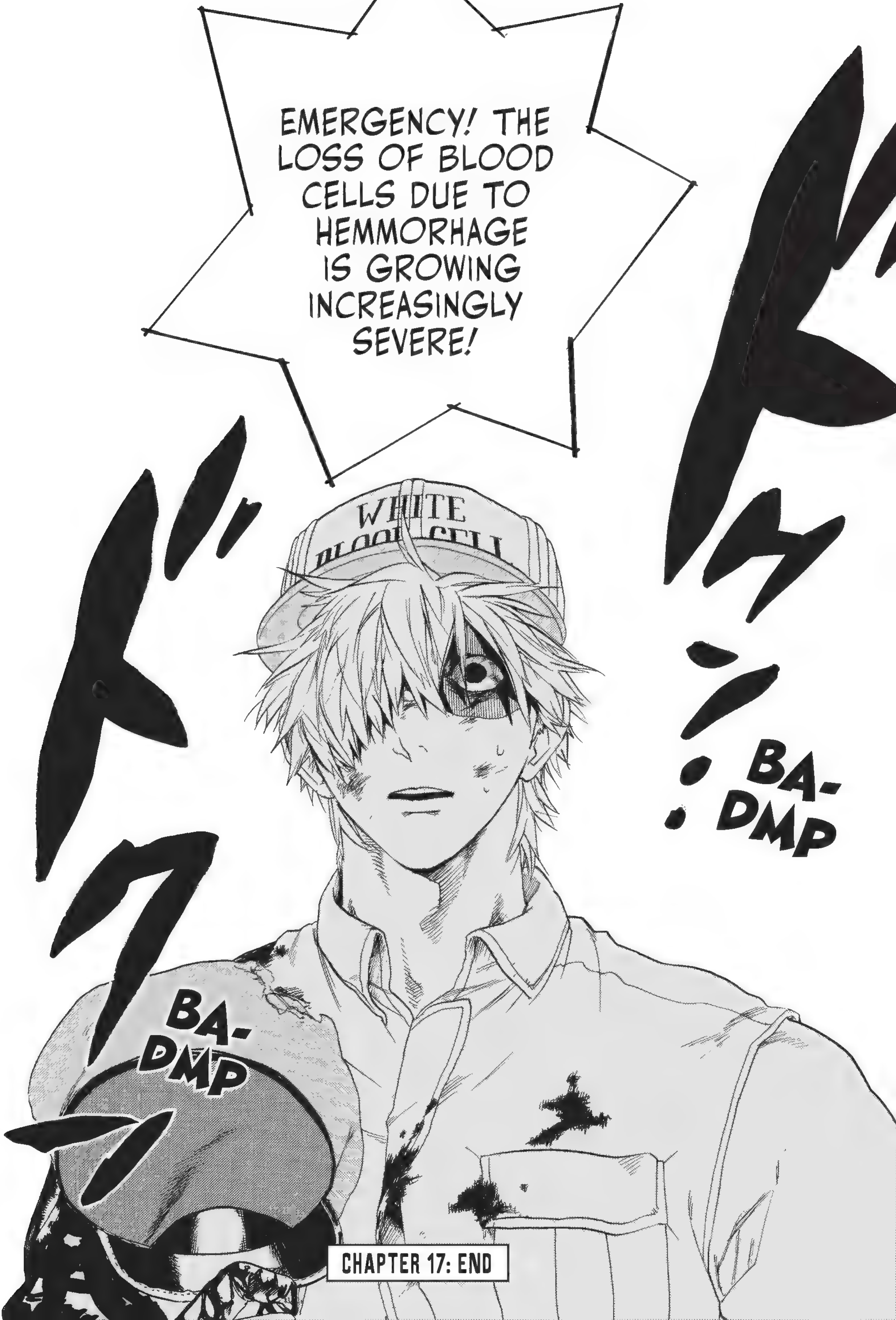

AE 3803
WE CAN PANIC ALL WE WANT LATER.
RIGHT NOW, WE'RE GOING TO CARRY OXYGEN!!
HUH ?!
バキ KRAK
バキ KRAK
HYAH HA HA HA!
THIS BODY IS ALLLL...


GRAAAAAAAAAAAAH!
SLASH
...OURS N— GUUH!
UGH! WHITE BLOOD CELLS ARE ALL OVER THE TISSUES!
ガシャーン
SMASH
I'LL JUST GET AWAY THROUGH A BLOOD VESSEL—
ガシッ
GRAB
WHITE BLOOD CELL
1146
THINK YOU'RE GETTING AWAY?!


CRASH
HNGH
GYAAAH!
HMPH... I MUST BE GETTING CLOSER TO THE WOUND!
PLOP
ボテ
PLOP
ボテ
KTCH
THAT PROBABLY MEANS THERE'LL BE RED BLOOD CELLS BEING ATTACKED BY BACTERIA...!
I'LL FIND 'EM!
SILENCE
HM?
...? IT'S TOO QUIET...


...NO...
...THIS CAN'T BE...
ヒュオオオ
WHOOOSH
O2


ALL THE BLOOD CELLS...
WHOOOOSH
...ARE GONE...

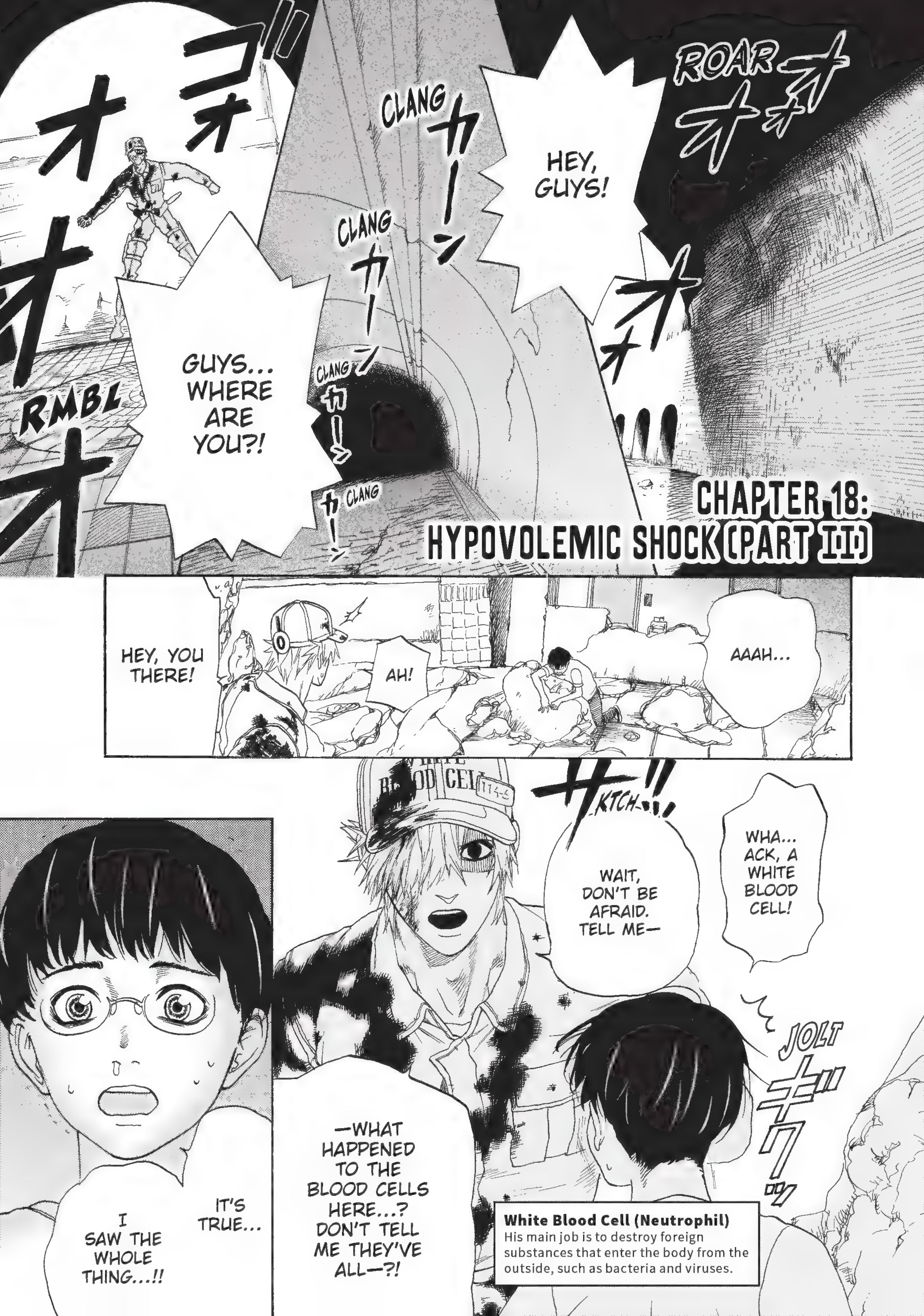

EMERGENCY! THE LOSS OF BLOOD CELLS DUE TO HEMMORHAGE IS GROWING INCREASINGLY SEVERE!
WHITE
BA-DMP
BA-DMP
CHAPTER 17: END

WHITE
BLOOD CELL
1146

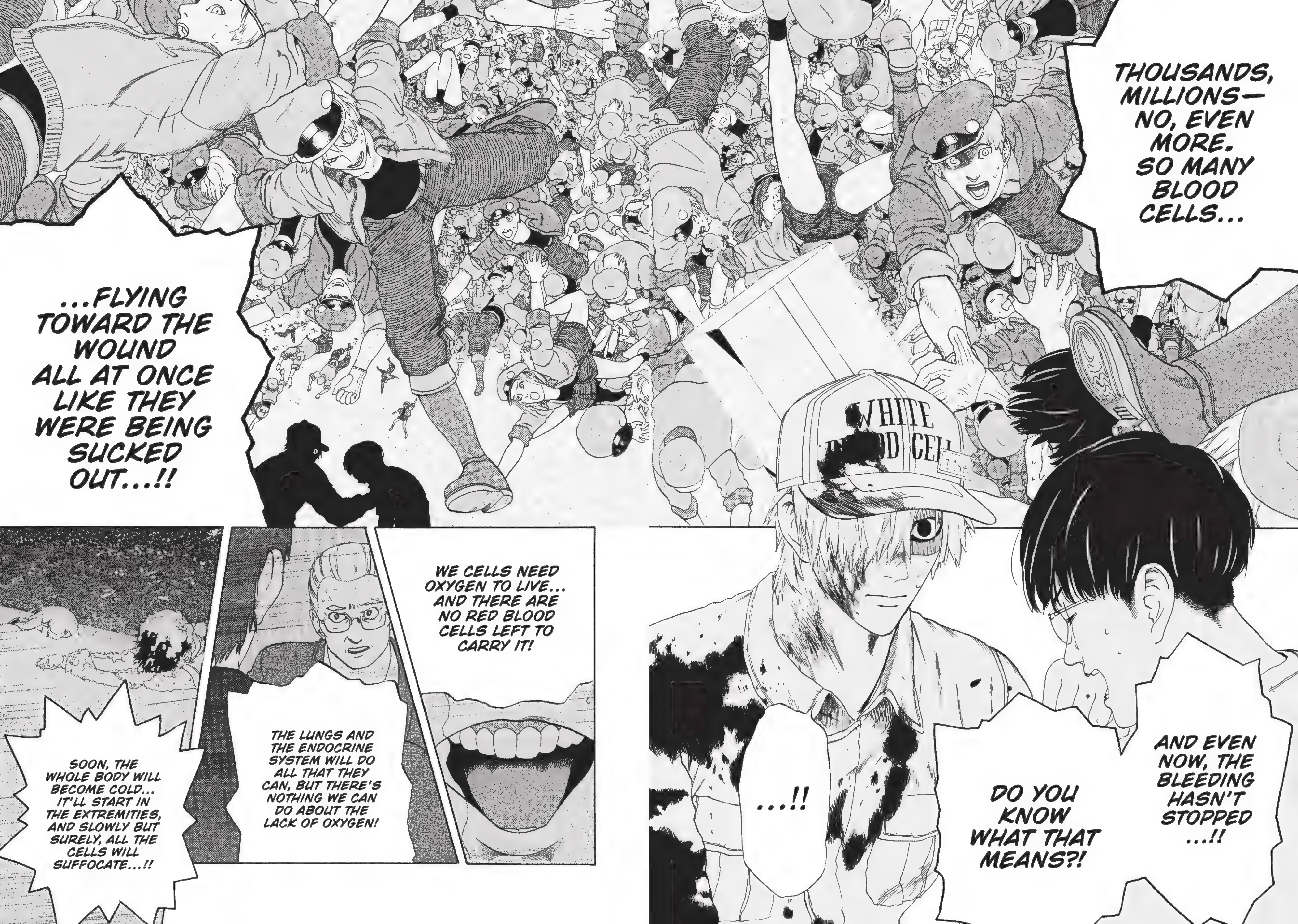
Cells at Work!

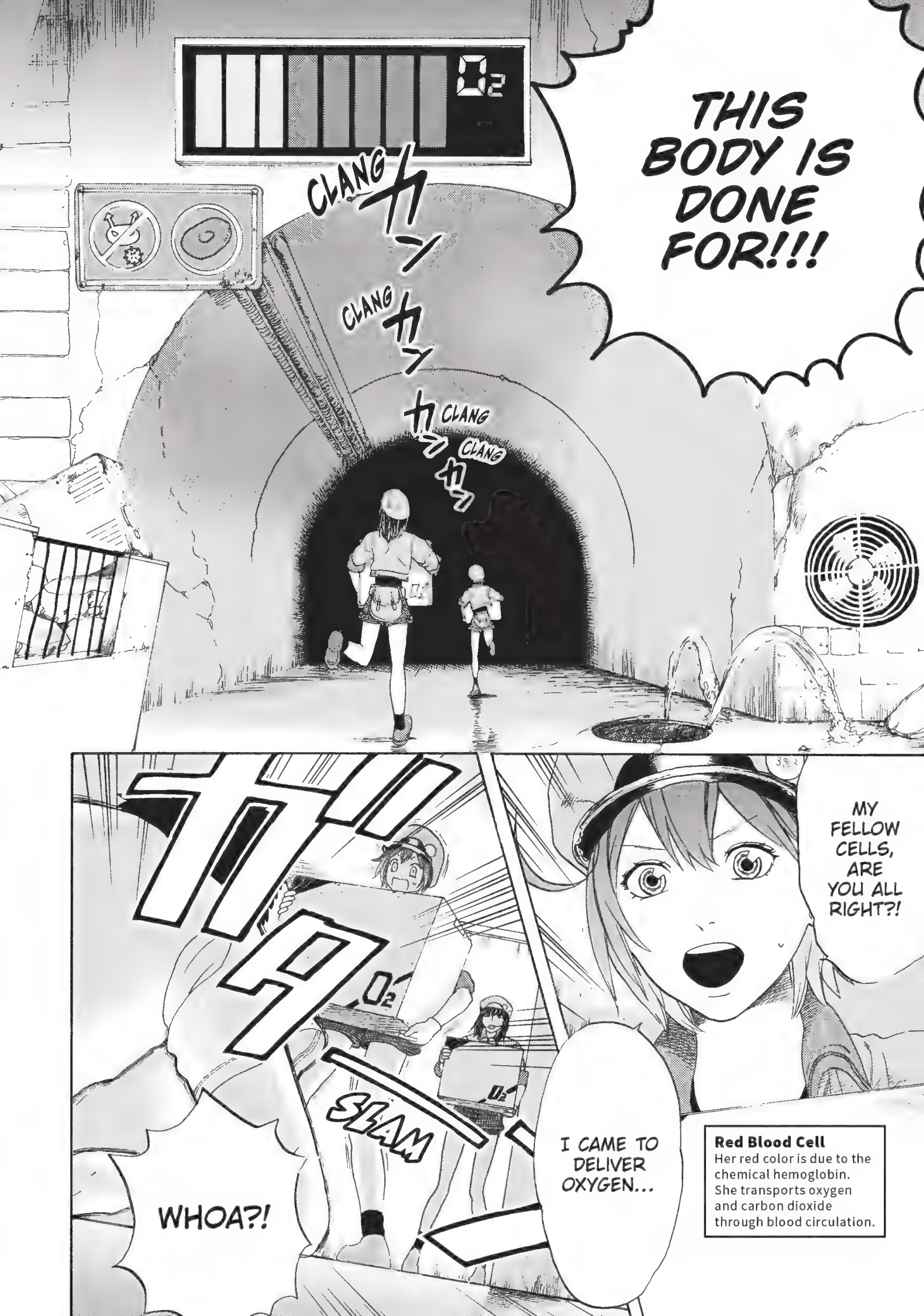
はたらく細胞

# CHAPTER 18: HYPOVOLEMIC SHOCK (PART II)

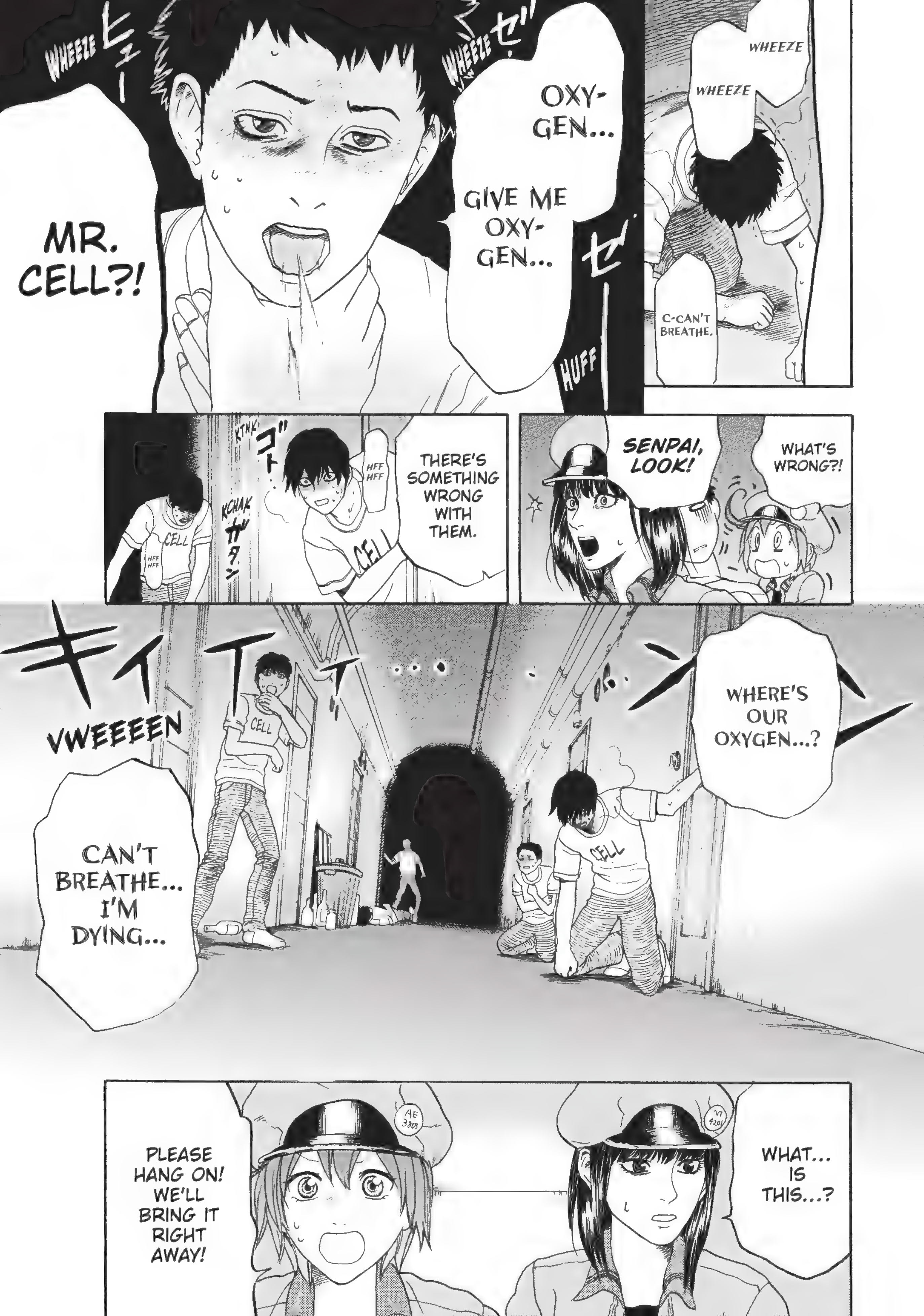

ROAR
HEY, GUYS!
CLANG
CLANG
CLANG
CLANG
GUYS... WHERE ARE YOU?!
RMBL
AAAH...
AH!
HEY, YOU THERE!
KTCH!!
WHA... ACK, A WHITE BLOOD CELL!
WHITE BLOOD CELL 1146
WAIT, DON'T BE AFRAID. TELL ME—
—WHAT HAPPENED TO THE BLOOD CELLS HERE...? DON'T TELL ME THEY'VE ALL—?!
JOLT
IT'S TRUE...
I SAW THE WHOLE THING...!!

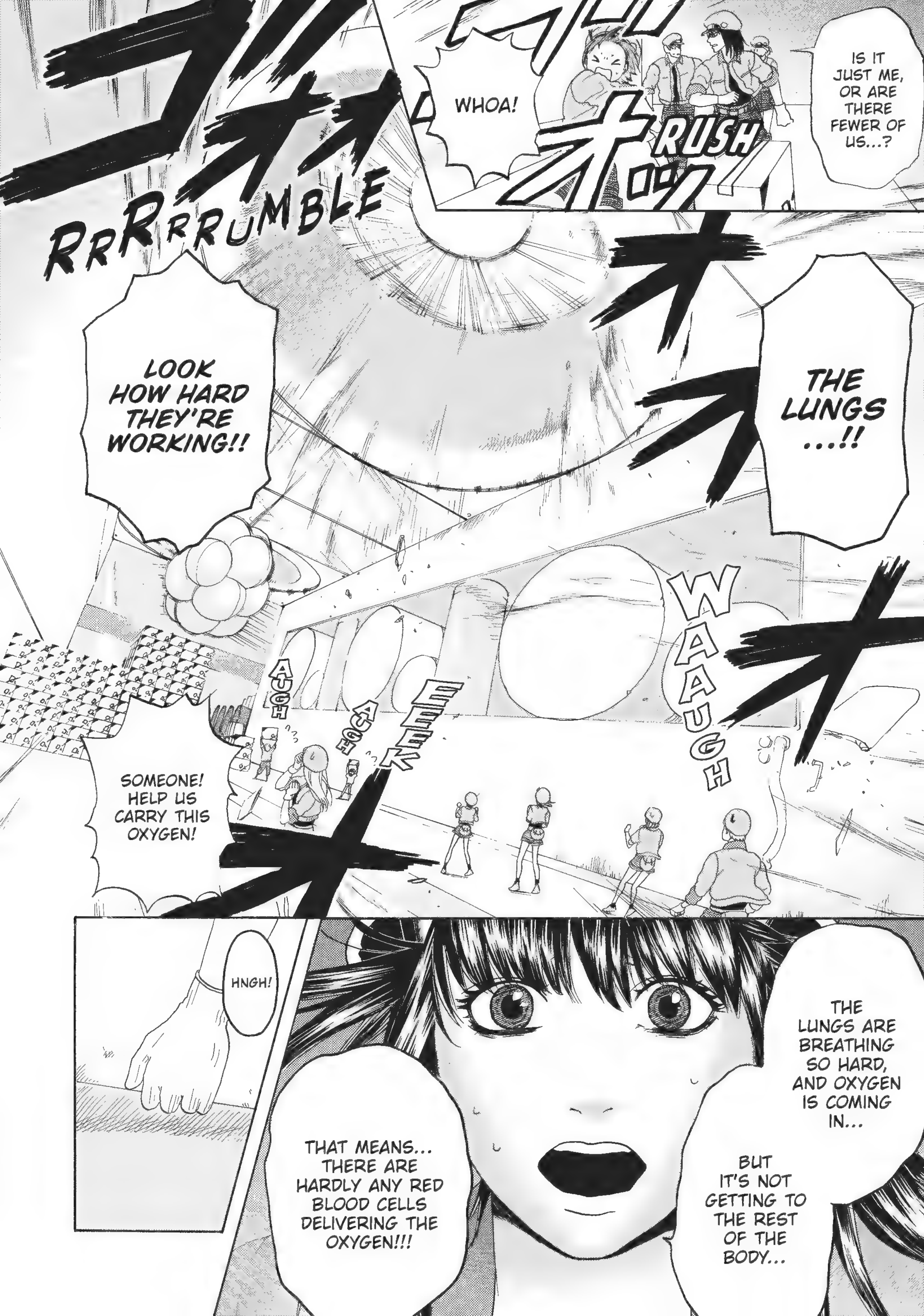
**White Blood Cell (Neutrophil)**
His main job is to destroy foreign substances that enter the body from the outside, such as bacteria and viruses.

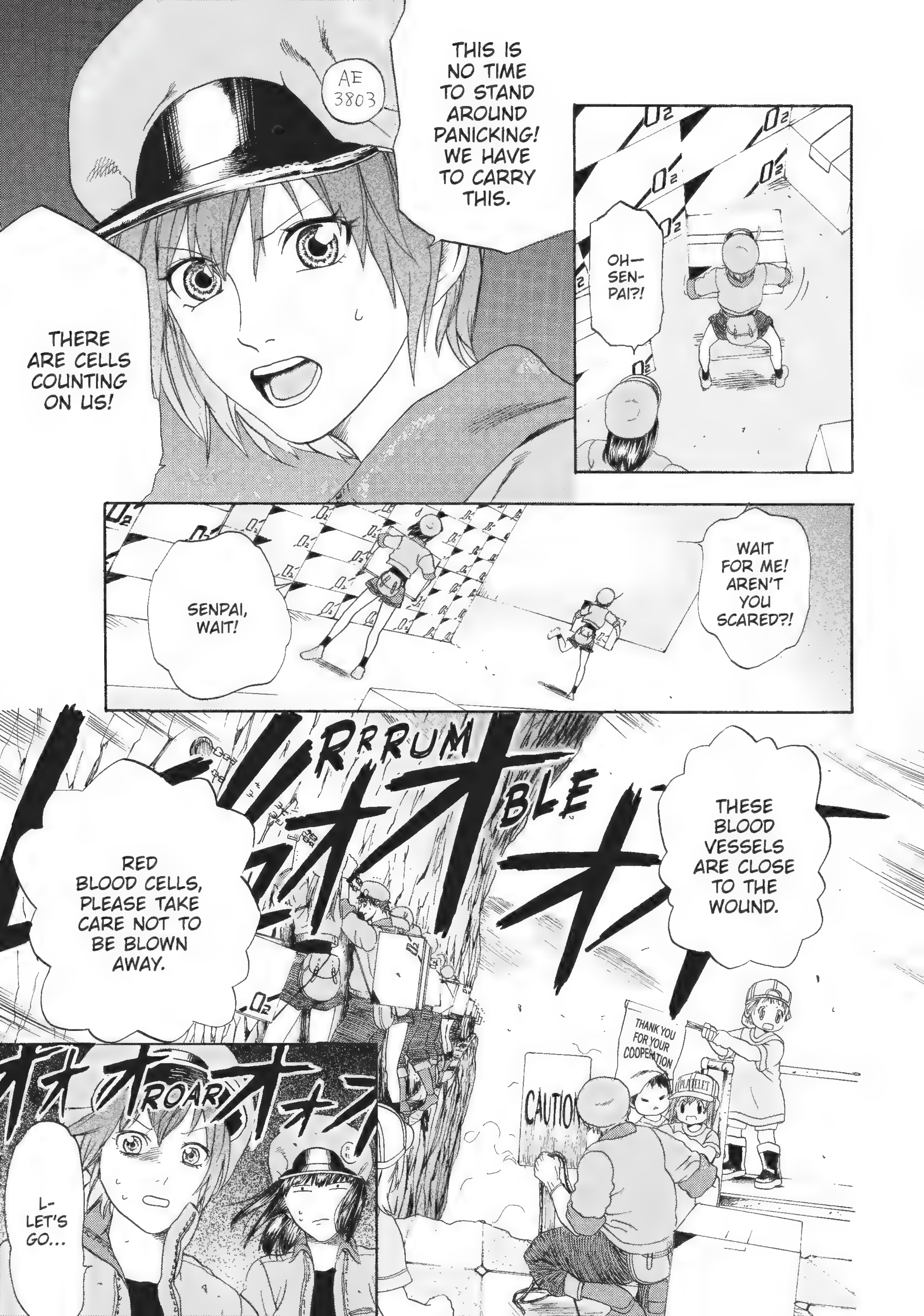

THOUSANDS, MILLIONS— NO, EVEN MORE. SO MANY BLOOD CELLS...
...FLYING TOWARD THE WOUND ALL AT ONCE LIKE THEY WERE BEING SUCKED OUT...!!
AND EVEN NOW, THE BLEEDING HASN'T STOPPED ...!!
DO YOU KNOW WHAT THAT MEANS?!
...!!
WE CELLS NEED OXYGEN TO LIVE... AND THERE ARE NO RED BLOOD CELLS LEFT TO CARRY IT!
THE LUNGS AND THE ENDOCRINE SYSTEM WILL DO ALL THAT THEY CAN, BUT THERE'S NOTHING WE CAN DO ABOUT THE LACK OF OXYGEN!
SOON, THE WHOLE BODY WILL BECOME COLD... IT'LL START IN THE EXTREMITIES, AND SLOWLY BUT SURELY, ALL THE CELLS WILL SUFFOCATE...!!

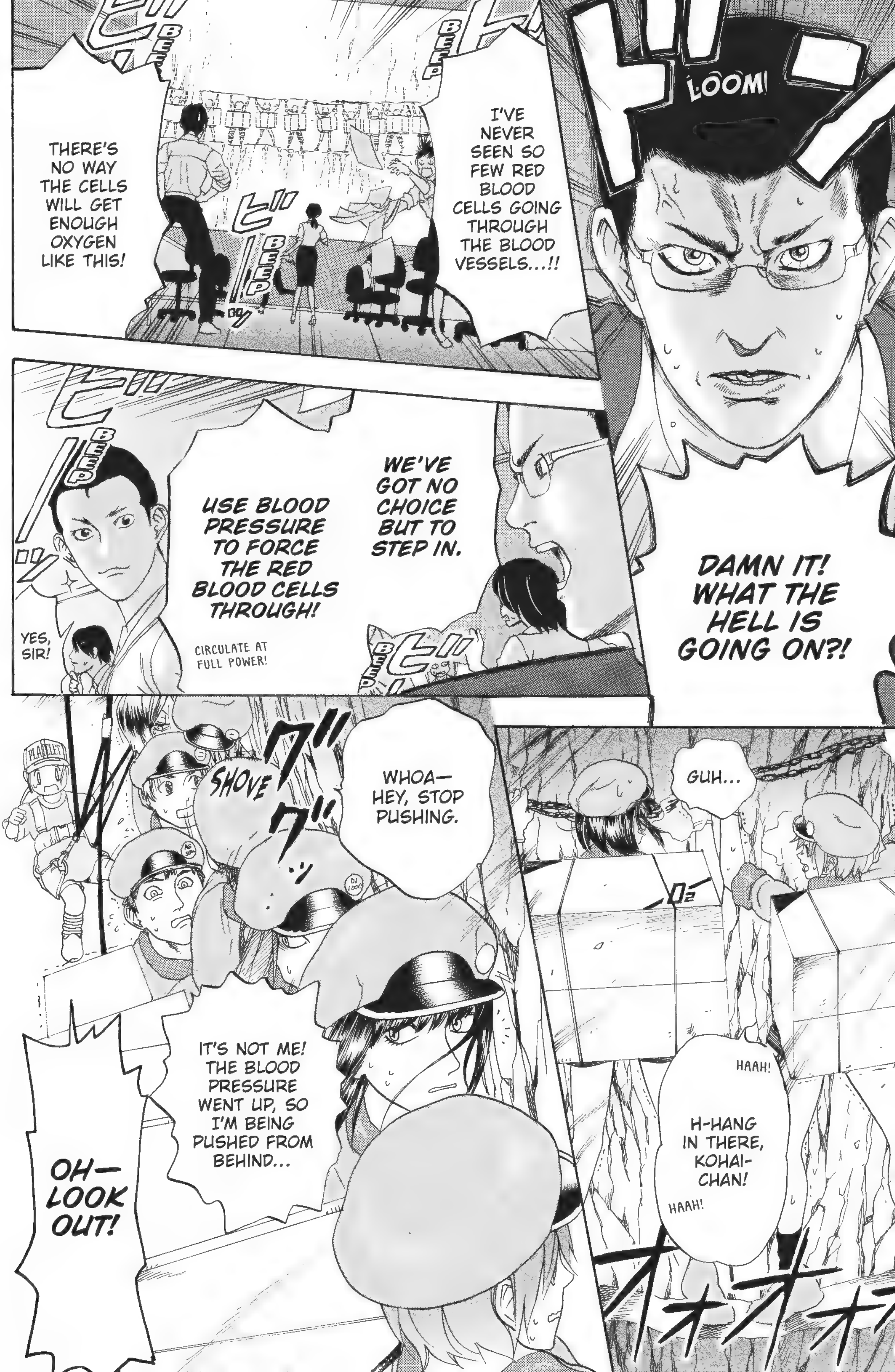

O2
THIS BODY IS DONE FOR!!!
CLANG
CLANG
CLANG
CLANG
MY FELLOW CELLS, ARE YOU ALL RIGHT?!
I CAME TO DELIVER OXYGEN...
O2
O2
SLAM
WHOA?!

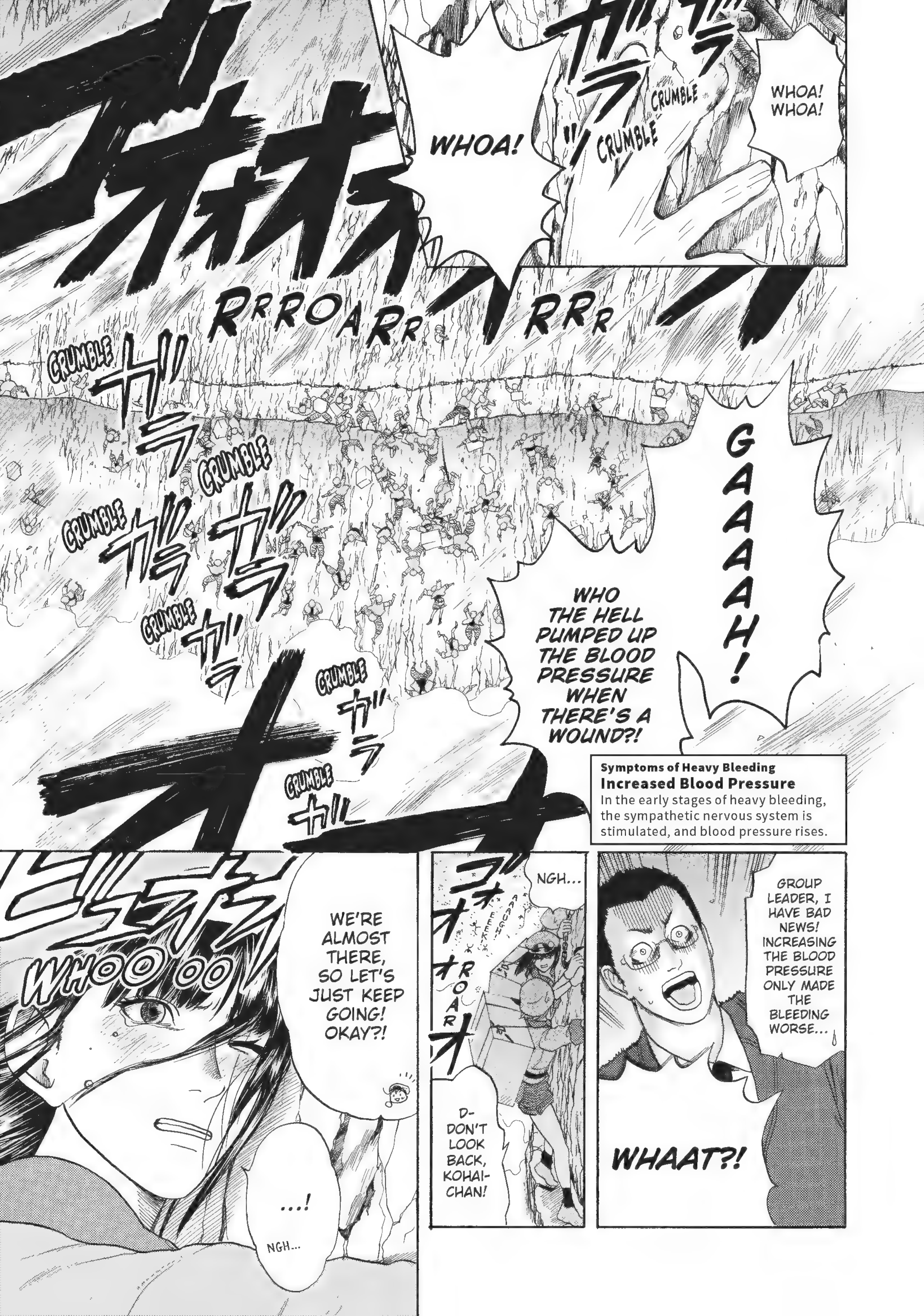
**Red Blood Cell**
Her red color is due to the chemical hemoglobin. She transports oxygen and carbon dioxide through blood circulation.


WHEEZE
WHEEZE
C-CAN'T BREATHE.
WHEEZE ゼッ
WHEEZE ヒュー
OXY-GEN...
GIVE ME OXY-GEN...
ゼ
HUFF
MR. CELL?!
WHAT'S WRONG?!
SENPAI, LOOK!
THERE'S SOMETHING WRONG WITH THEM.
HFF HFF
KTNK ゴト
KCHAK ガタン
HFF HFF
キイィィン
VWEEEEN
WHERE'S OUR OXYGEN...?
CAN'T BREATHE... I'M DYING...
VT 4201
AE 3803
WHAT... IS THIS...?
PLEASE HANG ON! WE'LL BRING IT RIGHT AWAY!


IS IT JUST ME, OR ARE THERE FEWER OF US...?
RUSH
WHOA!
RRRRRRUMBLE
THE LUNGS...!!
LOOK HOW HARD THEY'RE WORKING!!
WAAAUGH
EEEK
AUGH
AUGH
SOMEONE! HELP US CARRY THIS OXYGEN!
THE LUNGS ARE BREATHING SO HARD, AND OXYGEN IS COMING IN...
BUT IT'S NOT GETTING TO THE REST OF THE BODY...
THAT MEANS... THERE ARE HARDLY ANY RED BLOOD CELLS DELIVERING THE OXYGEN!!!
HNGH!


OH— SEN-PAI?!
AE 3803
THIS IS NO TIME TO STAND AROUND PANICKING! WE HAVE TO CARRY THIS.
THERE ARE CELLS COUNTING ON US!
WAIT FOR ME! AREN'T YOU SCARED?!
SENPAI, WAIT!
RRRUMBLE
THESE BLOOD VESSELS ARE CLOSE TO THE WOUND.
RED BLOOD CELLS, PLEASE TAKE CARE NOT TO BE BLOWN AWAY.
THANK YOU FOR YOUR COOPERATION
PLATELET
CAUTION
ROAR
L- LET'S GO...

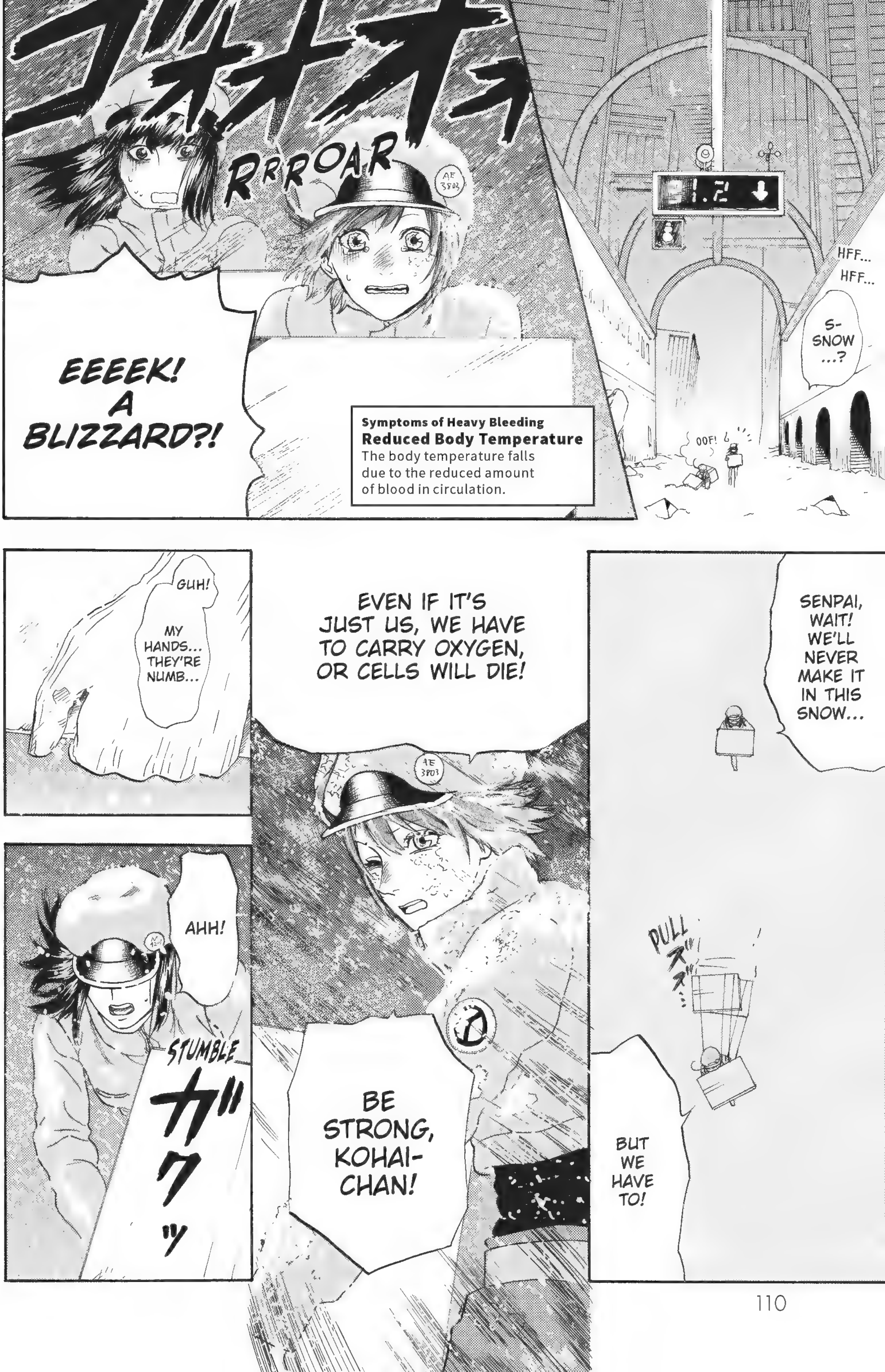

BEEP
BEEP
I'VE NEVER SEEN SO FEW RED BLOOD CELLS GOING THROUGH THE BLOOD VESSELS...!!
THERE'S NO WAY THE CELLS WILL GET ENOUGH OXYGEN LIKE THIS!
BEEP
LOOM!
DAMN IT! WHAT THE HELL IS GOING ON?!
WE'VE GOT NO CHOICE BUT TO STEP IN.
USE BLOOD PRESSURE TO FORCE THE RED BLOOD CELLS THROUGH!
CIRCULATE AT FULL POWER!
YES, SIR!
BEEP
BEEP
GUH...
HAAH!
H-HANG IN THERE, KOHAI-CHAN!
HAAH!
WHOA— HEY, STOP PUSHING.
SHOVE
IT'S NOT ME! THE BLOOD PRESSURE WENT UP, SO I'M BEING PUSHED FROM BEHIND...
OH— LOOK OUT!


WHOA!
WHOA!
CRUMBLE
CRUMBLE
WHOA!
RRROARR RRR
GAAAAAH!
WHO THE HELL PUMPED UP THE BLOOD PRESSURE WHEN THERE'S A WOUND?!
CRUMBLE
CRUMBLE
CRUMBLE
CRUMBLE
CRUMBLE
CRUMBLE
GROUP LEADER, I HAVE BAD NEWS! INCREASING THE BLOOD PRESSURE ONLY MADE THE BLEEDING WORSE...
WHAAT?!
NGH...
AAUGH!
EEEK!
ROAR
D-DON'T LOOK BACK, KOHAI-CHAN!
WHOOOOO
WE'RE ALMOST THERE, SO LET'S JUST KEEP GOING! OKAY?!
...!
NGH...

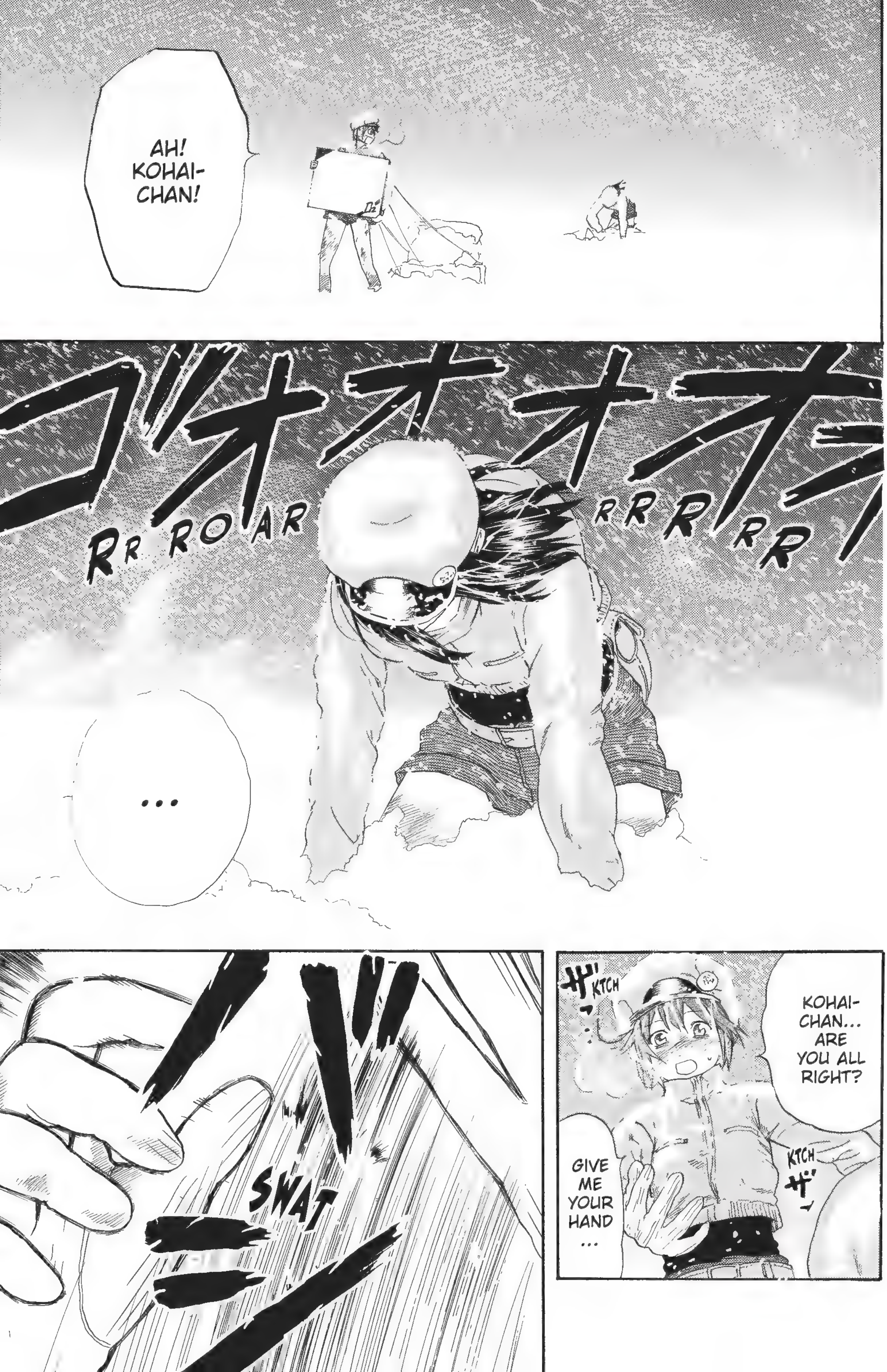
**Symptoms of Heavy Bleeding**

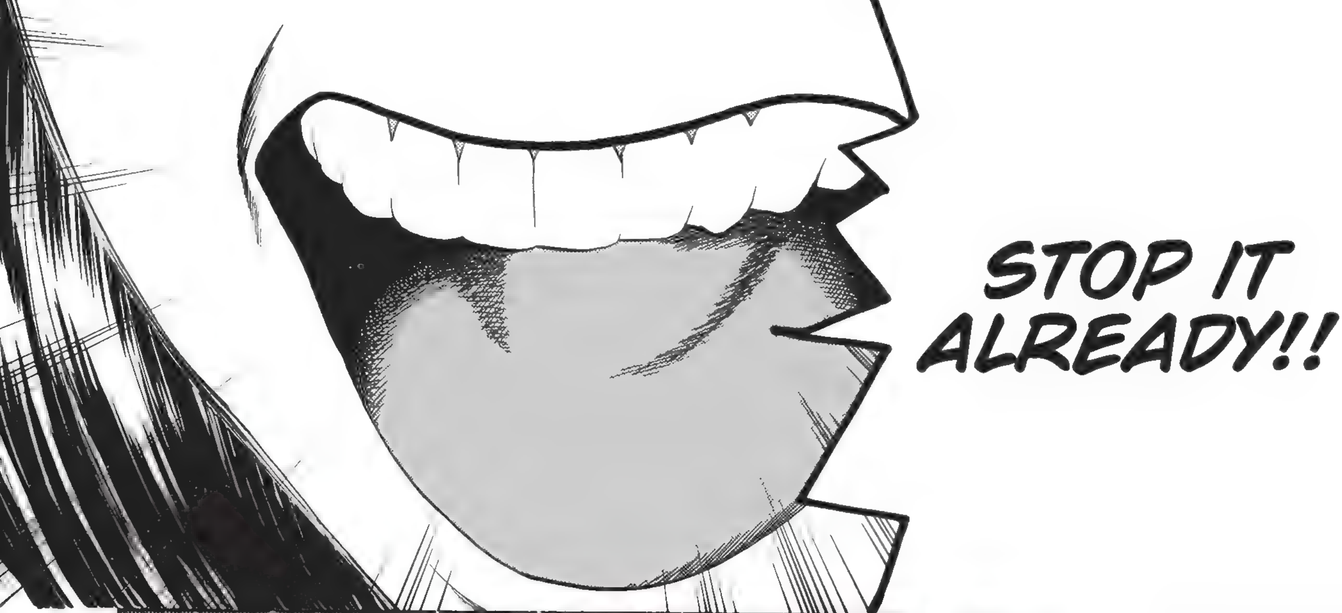
**Increased Blood Pressure**

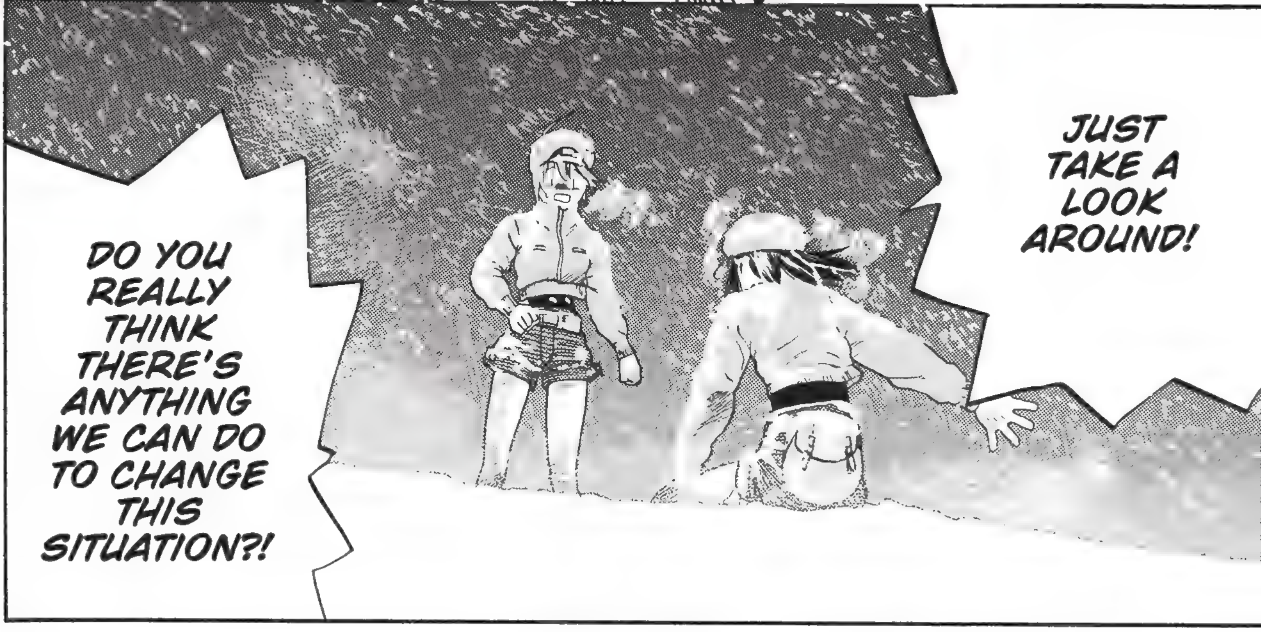
In the early stages of heavy bleeding, the sympathetic nervous system is stimulated, and blood pressure rises.

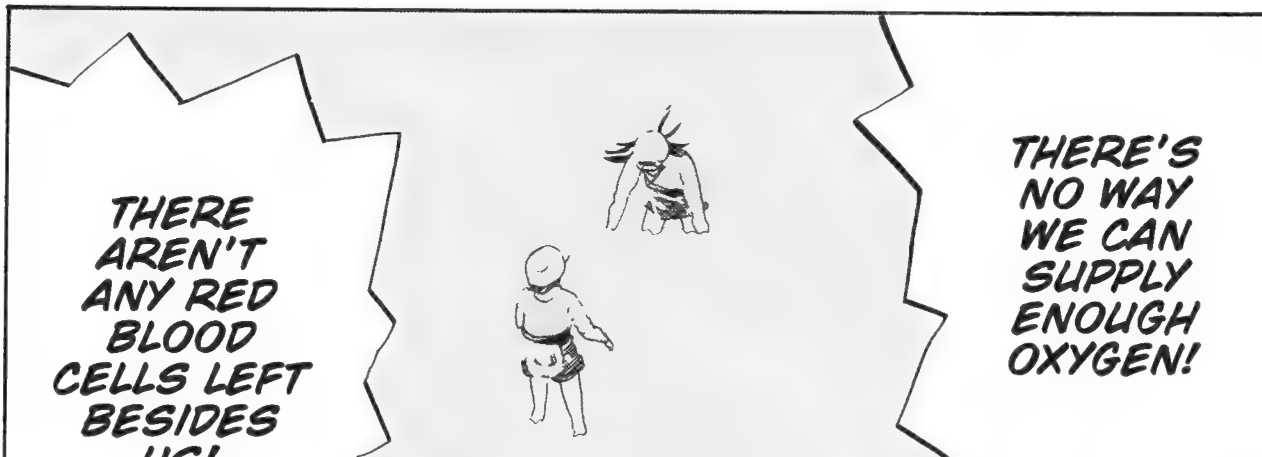

1.2 ↓
HFF...
HFF...
S-SNOW...?
OOF!
コオオオォ
RRROAR
AE 3803
EEEEK! A BLIZZARD?!
SENPAI, WAIT! WE'LL NEVER MAKE IT IN THIS SNOW...
PULL
ズズ…
BUT WE HAVE TO!
EVEN IF IT'S JUST US, WE HAVE TO CARRY OXYGEN, OR CELLS WILL DIE!
AE 3803
BE STRONG, KOHAI-CHAN!
GUH!
MY HANDS... THEY'RE NUMB...
AHH!
STUMBLE
ガクッ

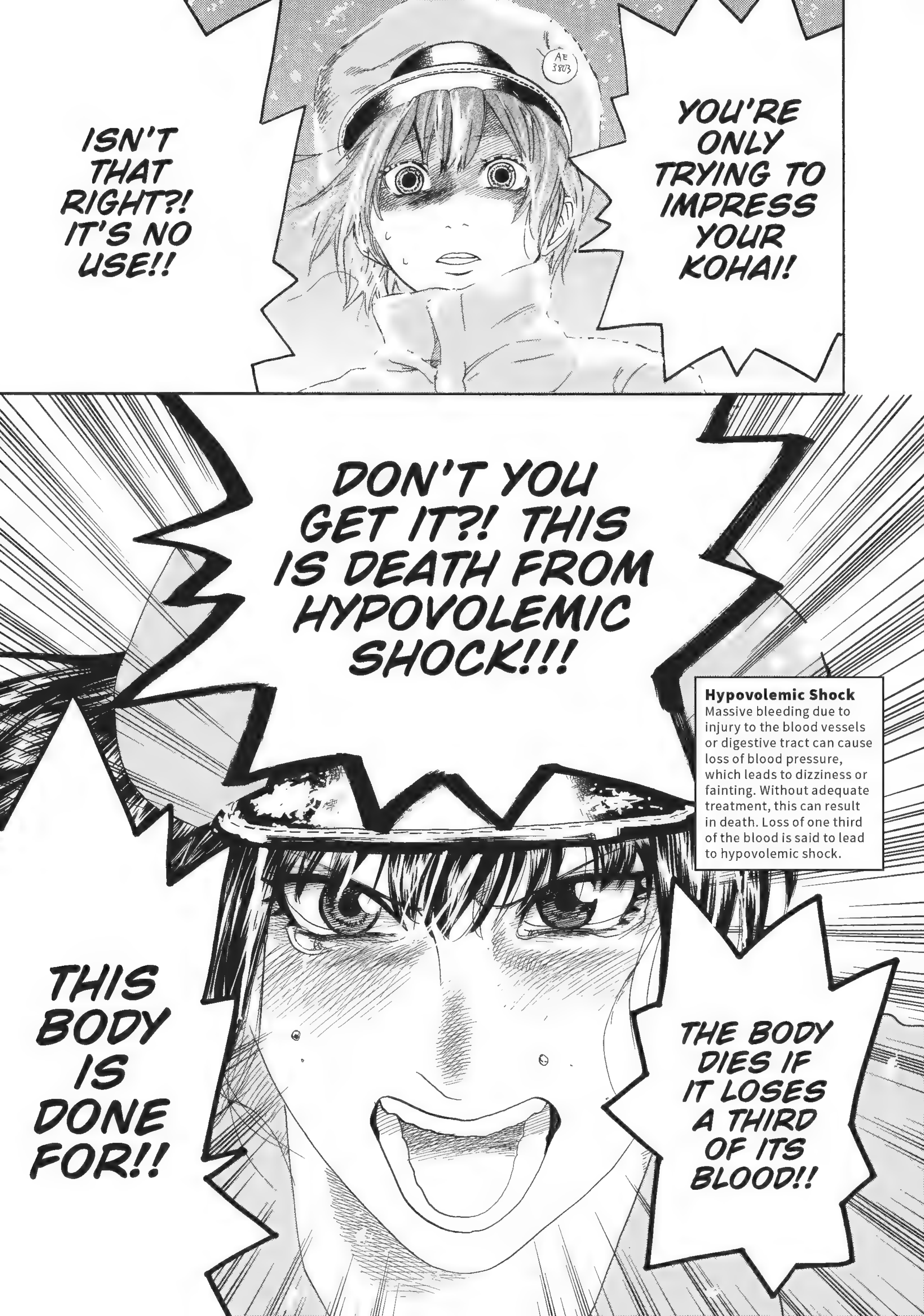
**Symptoms of Heavy Bleeding**
**Reduced Body Temperature**
The body temperature falls due to the reduced amount of blood in circulation.


AH! KOHAI-CHAN!
ゴオオオオ
RRROAR RRRRRRR
...
ザッ KTCH
KOHAI-CHAN... ARE YOU ALL RIGHT?
ザッ KTCH
GIVE ME YOUR HAND ...
SWAT

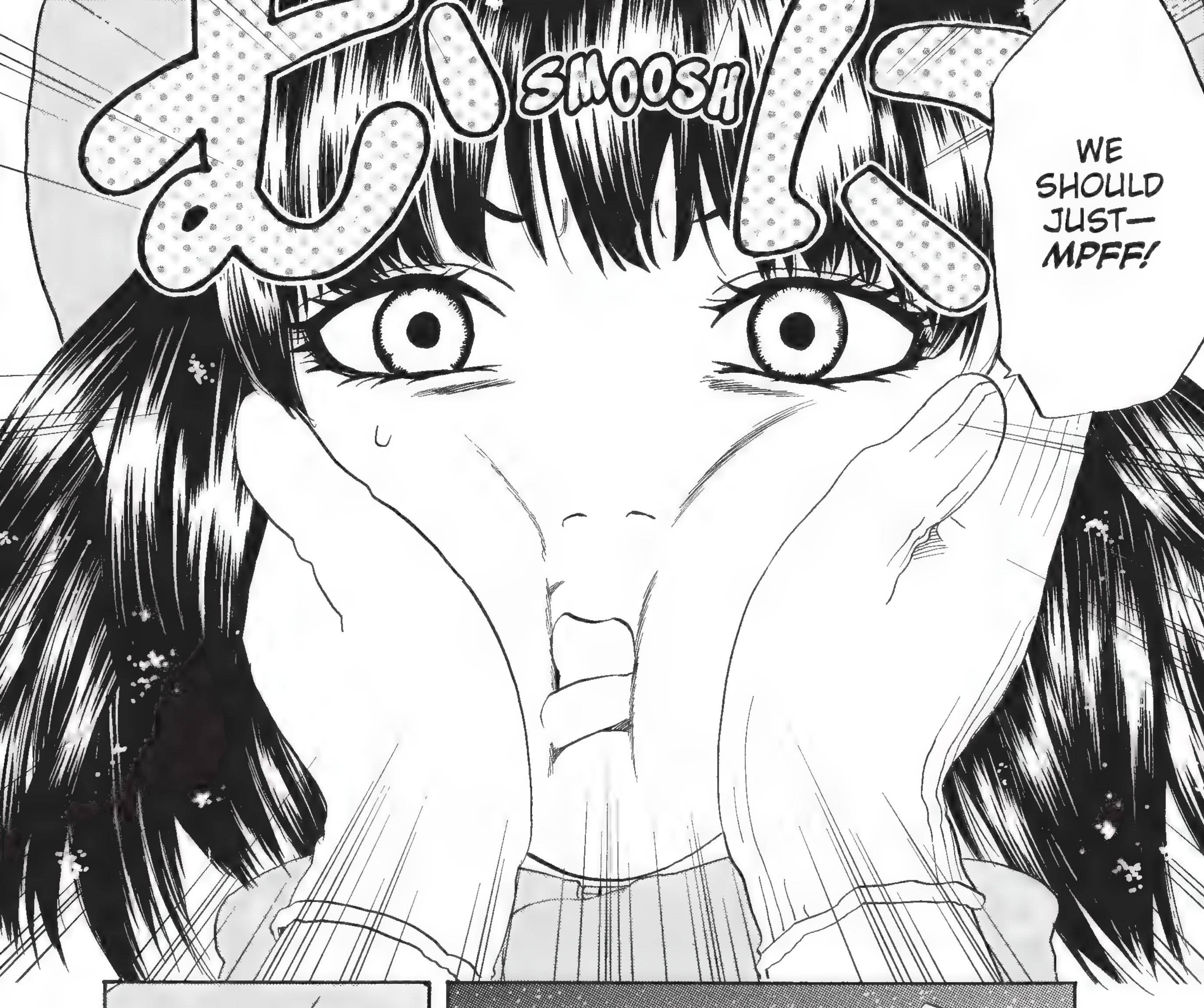

STOP IT ALREADY!!

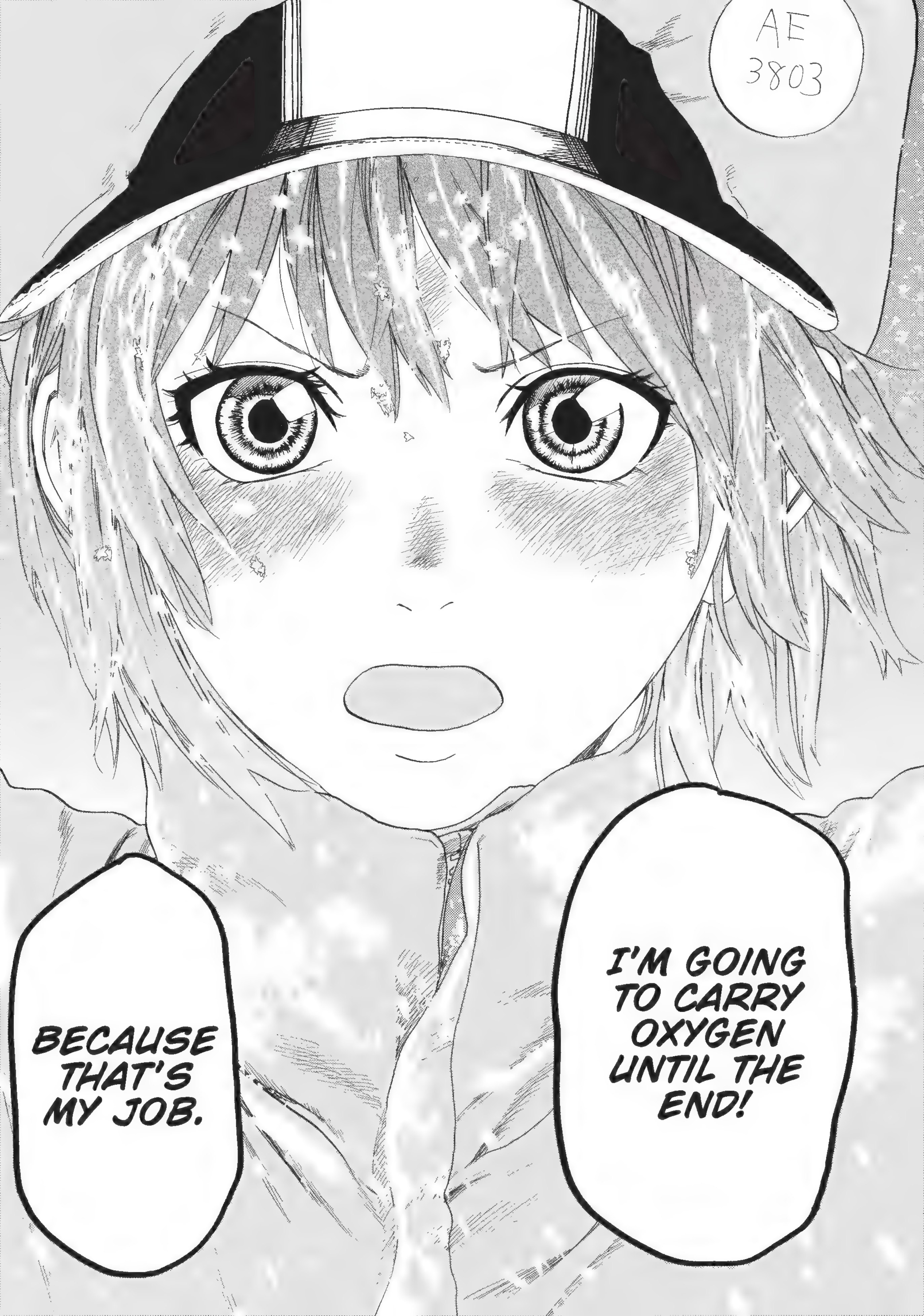

JUST TAKE A LOOK AROUND!
DO YOU REALLY THINK THERE'S ANYTHING WE CAN DO TO CHANGE THIS SITUATION?!

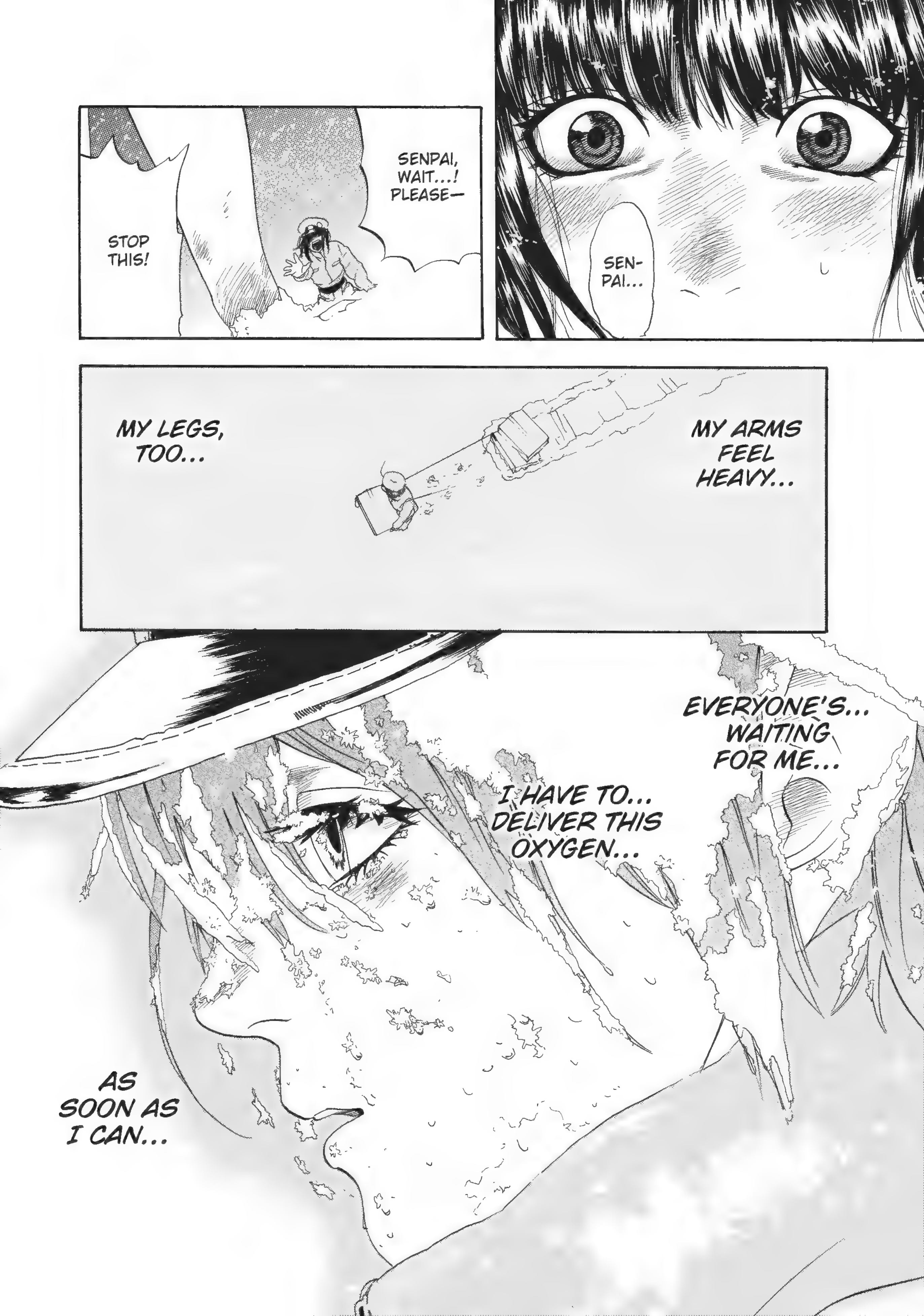

THERE'S NO WAY WE CAN SUPPLY ENOUGH OXYGEN!
THERE AREN'T ANY RED BLOOD CELLS LEFT BESIDES US!

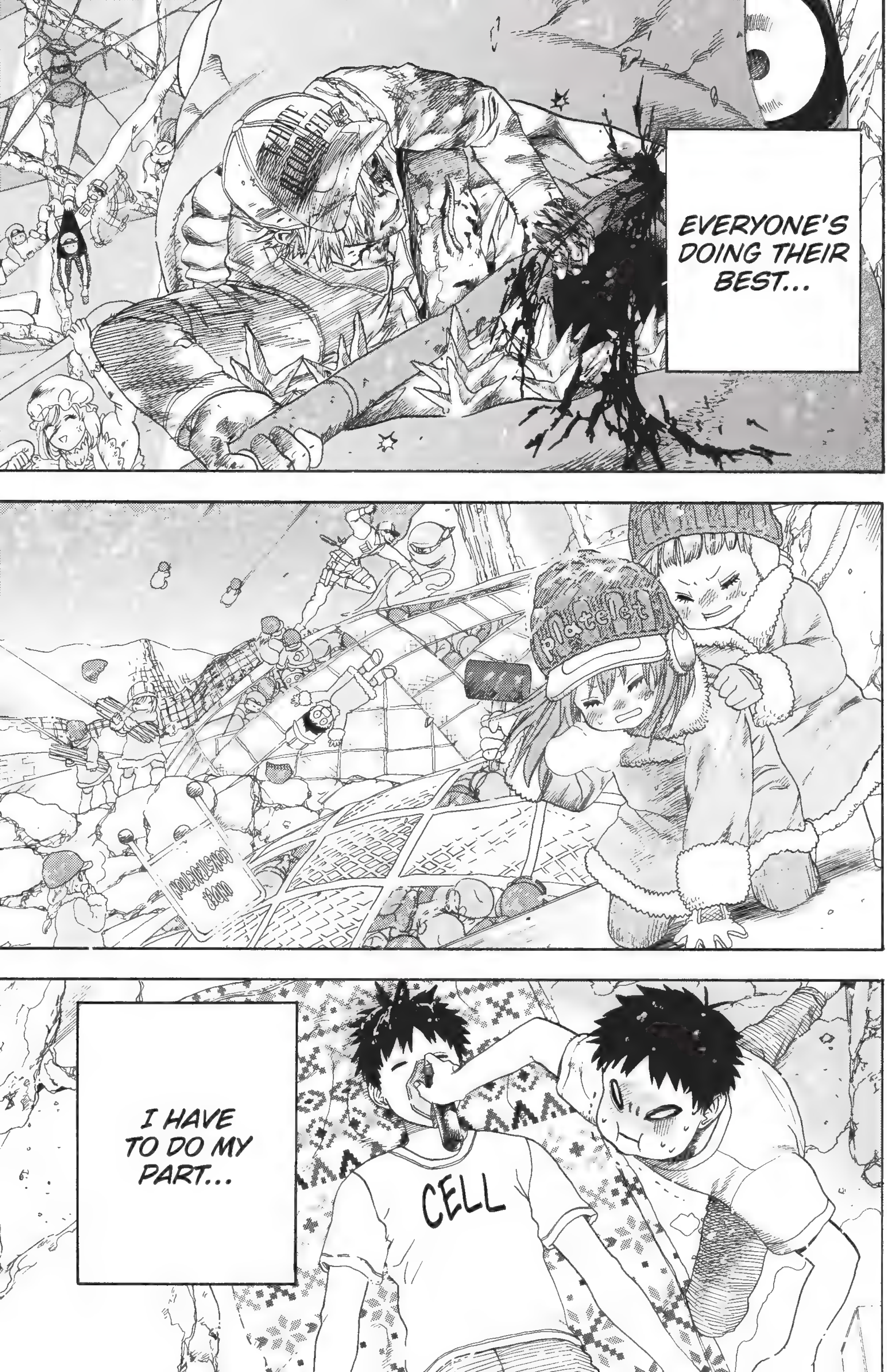

AE 3803
YOU'RE ONLY TRYING TO IMPRESS YOUR KOHAI!
ISN'T THAT RIGHT?! IT'S NO USE!!
DON'T YOU GET IT?! THIS IS DEATH FROM HYPOVOLEMIC SHOCK!!!
THE BODY DIES IF IT LOSES A THIRD OF ITS BLOOD!!
THIS BODY IS DONE FOR!!

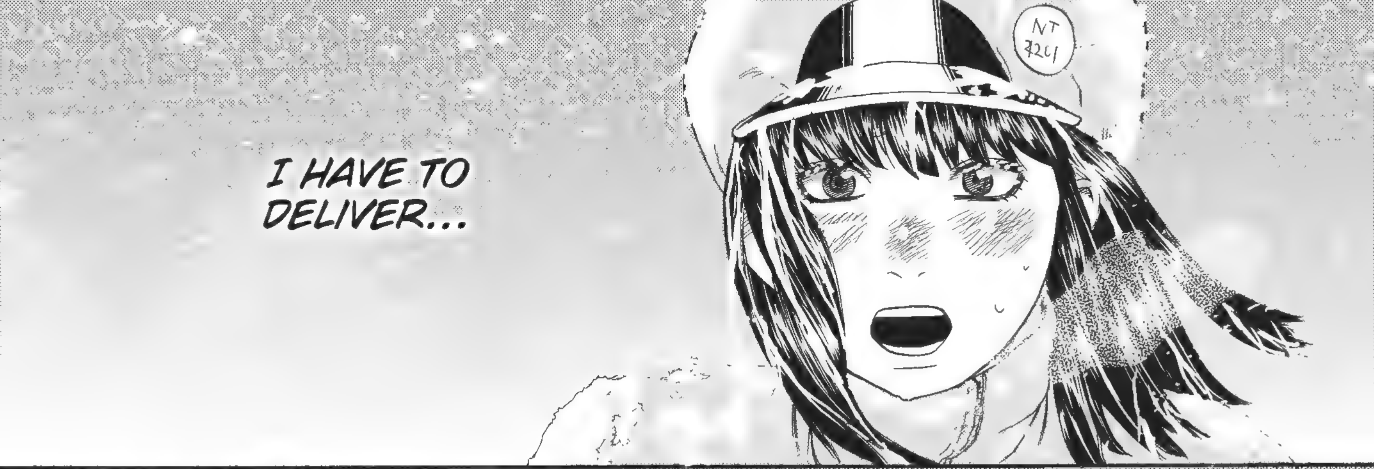
**Hypovolemic Shock**
Massive bleeding due to injury to the blood vessels or digestive tract can cause loss of blood pressure, which leads to dizziness or fainting. Without adequate treatment, this can result in death. Loss of one third of the blood is said to lead to hypovolemic shock.

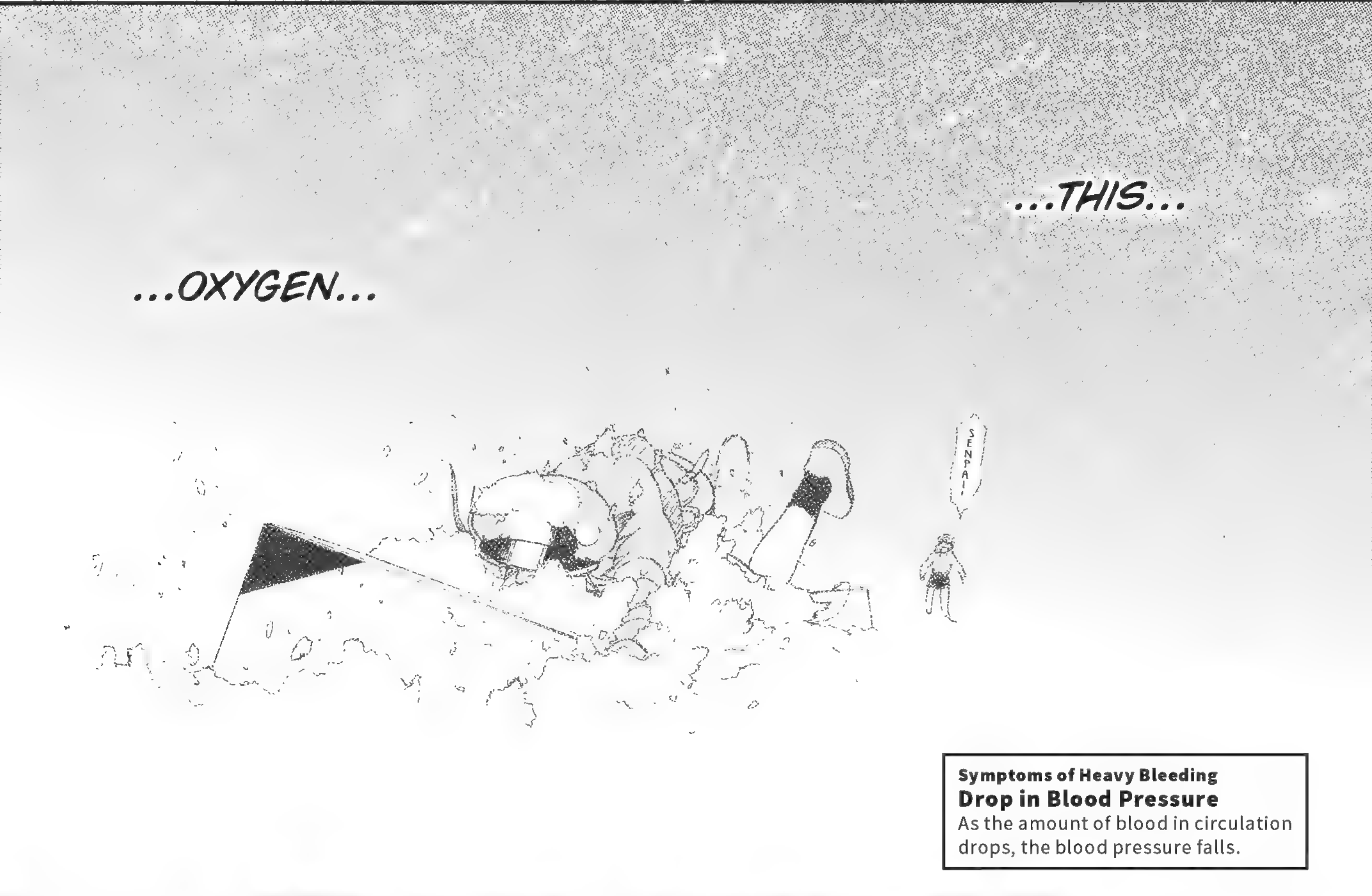

SMOOSH
WE SHOULD JUST—*MPFF!*
HUH...?
WHA... STOP, WHAT'RE YOU—?!
KOHAI-CHAN—!


AE 3803
I'M GOING TO CARRY OXYGEN UNTIL THE END!
BECAUSE THAT'S MY JOB.


SEN-PAI…
SENPAI, WAIT…! PLEASE—
STOP THIS!
MY ARMS FEEL HEAVY…
MY LEGS, TOO…
EVERYONE'S… WAITING FOR ME…
I HAVE TO… DELIVER THIS OXYGEN…
AS SOON AS I CAN…


EVERYONE'S DOING THEIR BEST...
platelet
I HAVE TO DO MY PART...
CELL

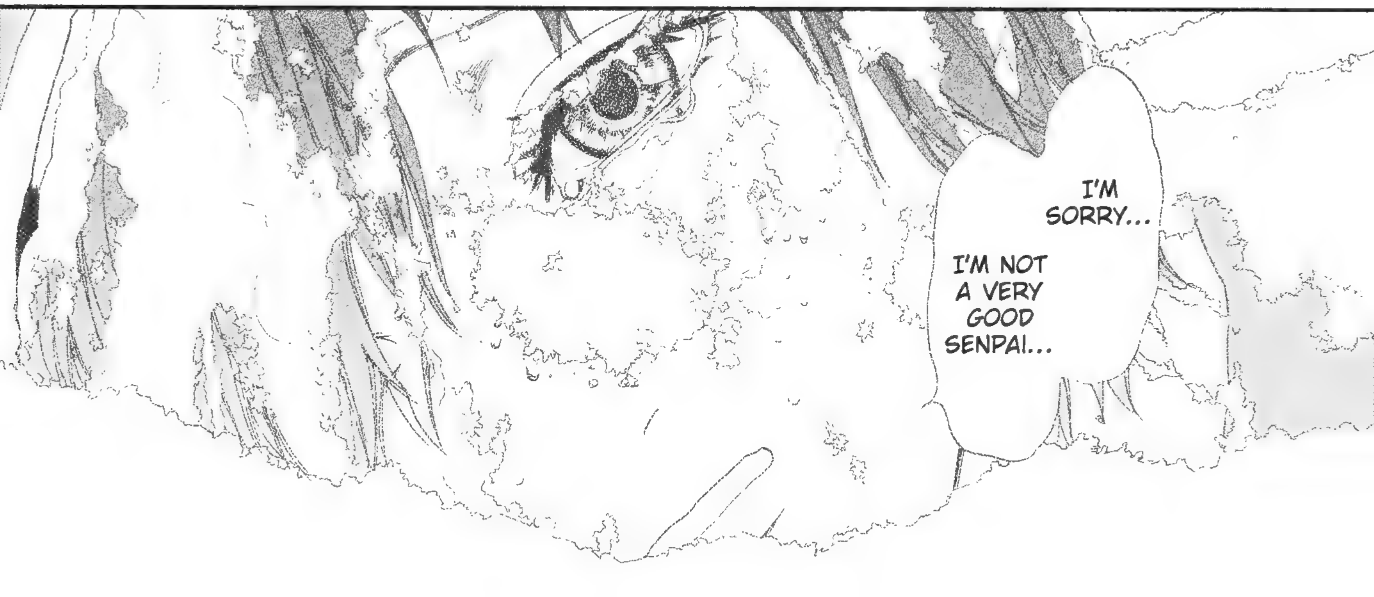

NT 7201
I HAVE TO DELIVER...

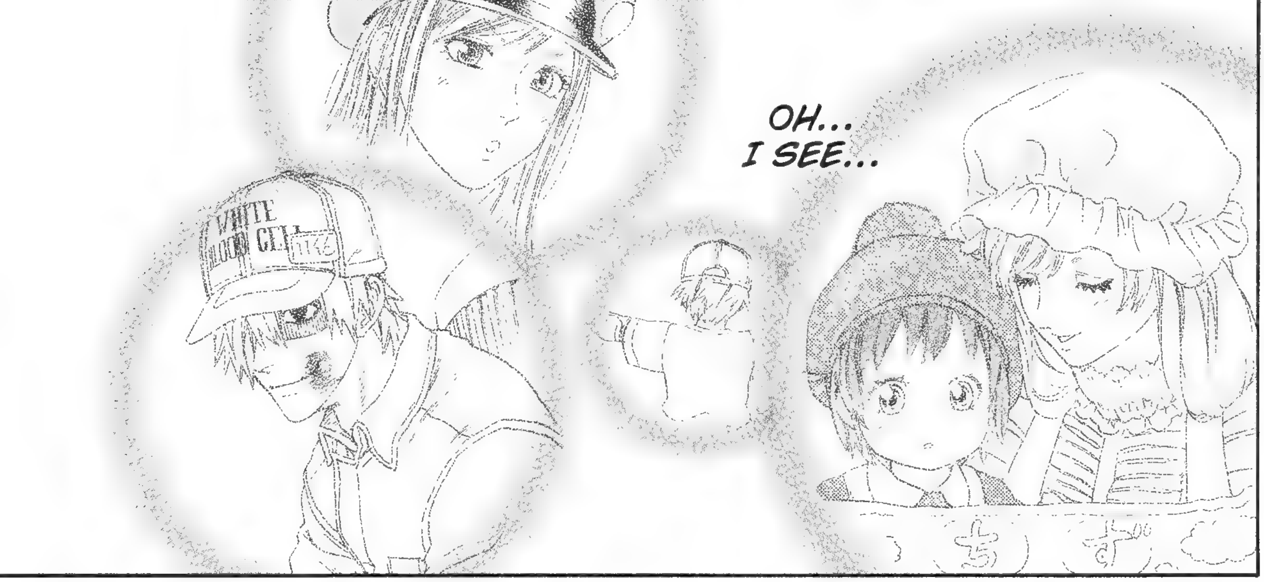

...THIS...
...OXYGEN...
SENPAI!

**Symptoms of Heavy Bleeding**

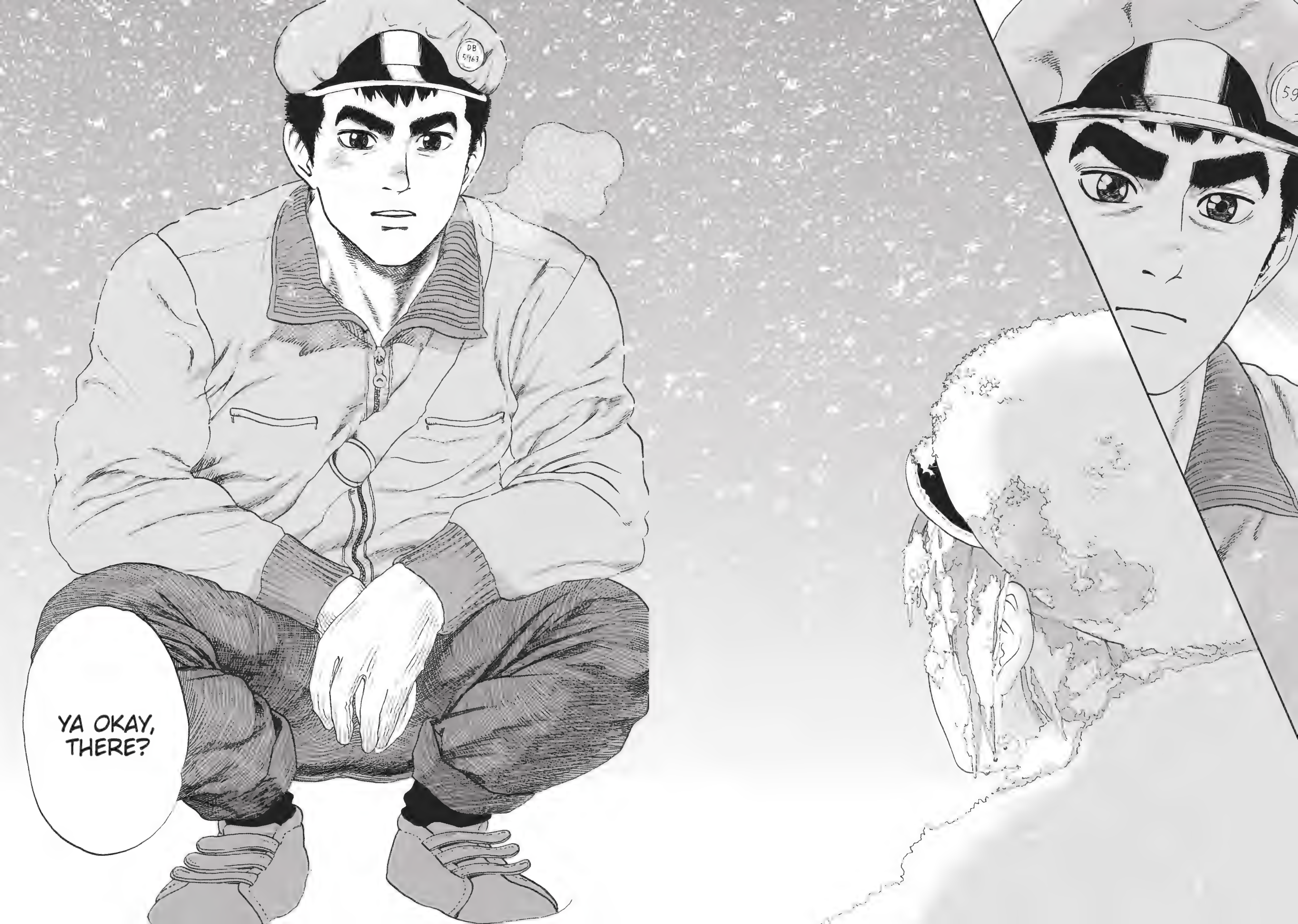
**Drop in Blood Pressure**

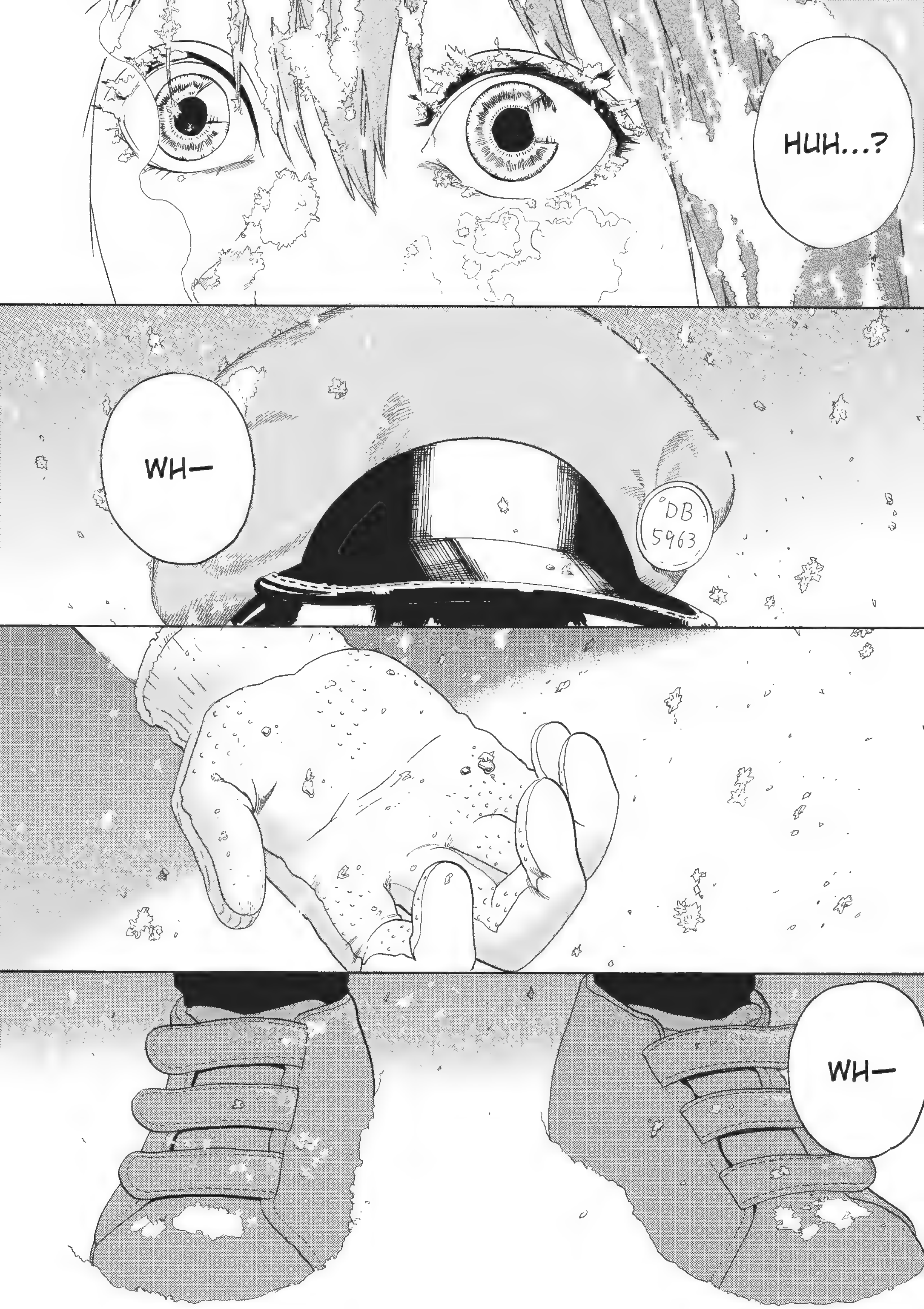
As the amount of blood in circulation drops, the blood pressure falls.

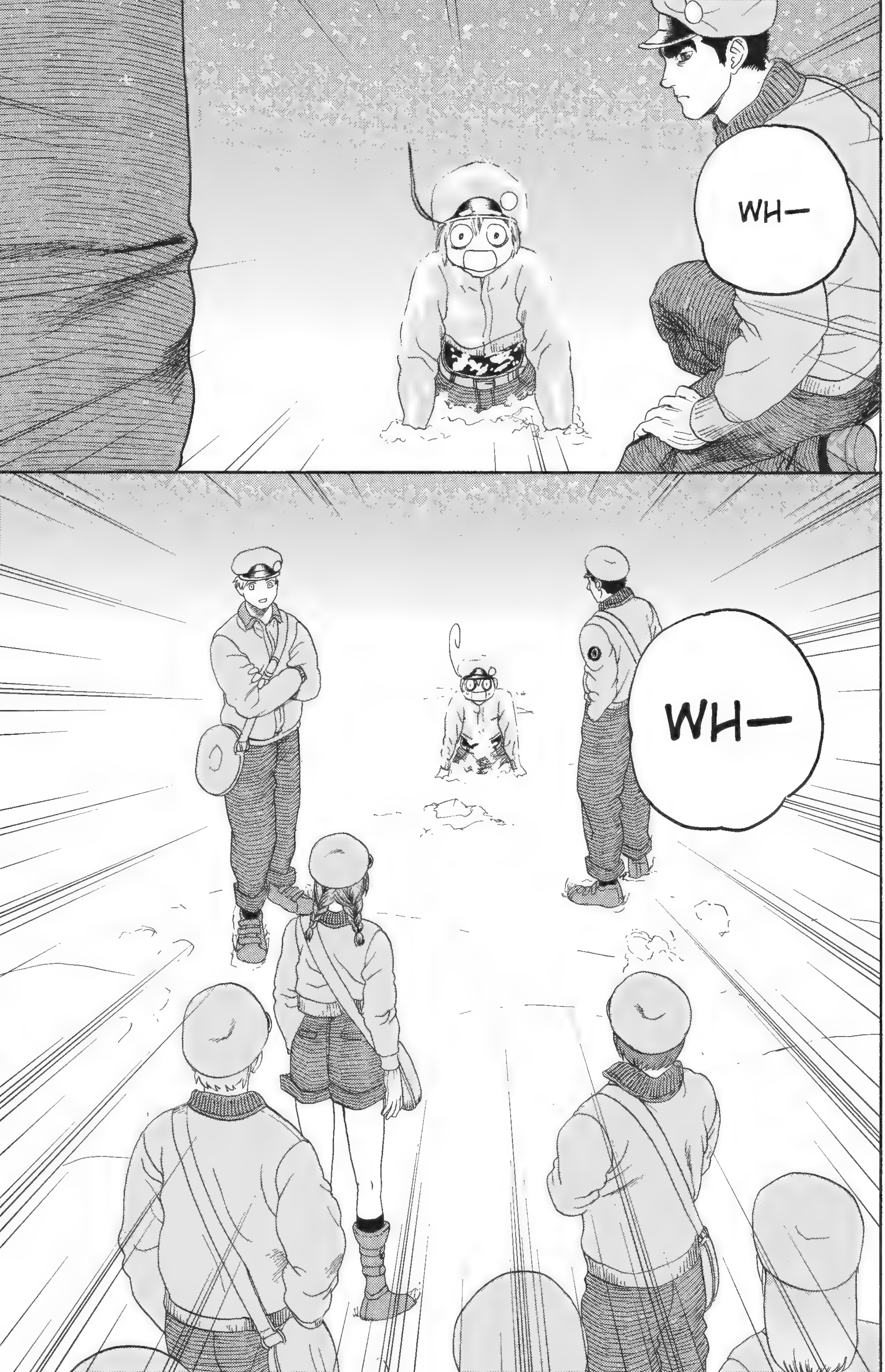

I'M SORRY...
I'M NOT A VERY GOOD SENPAI...

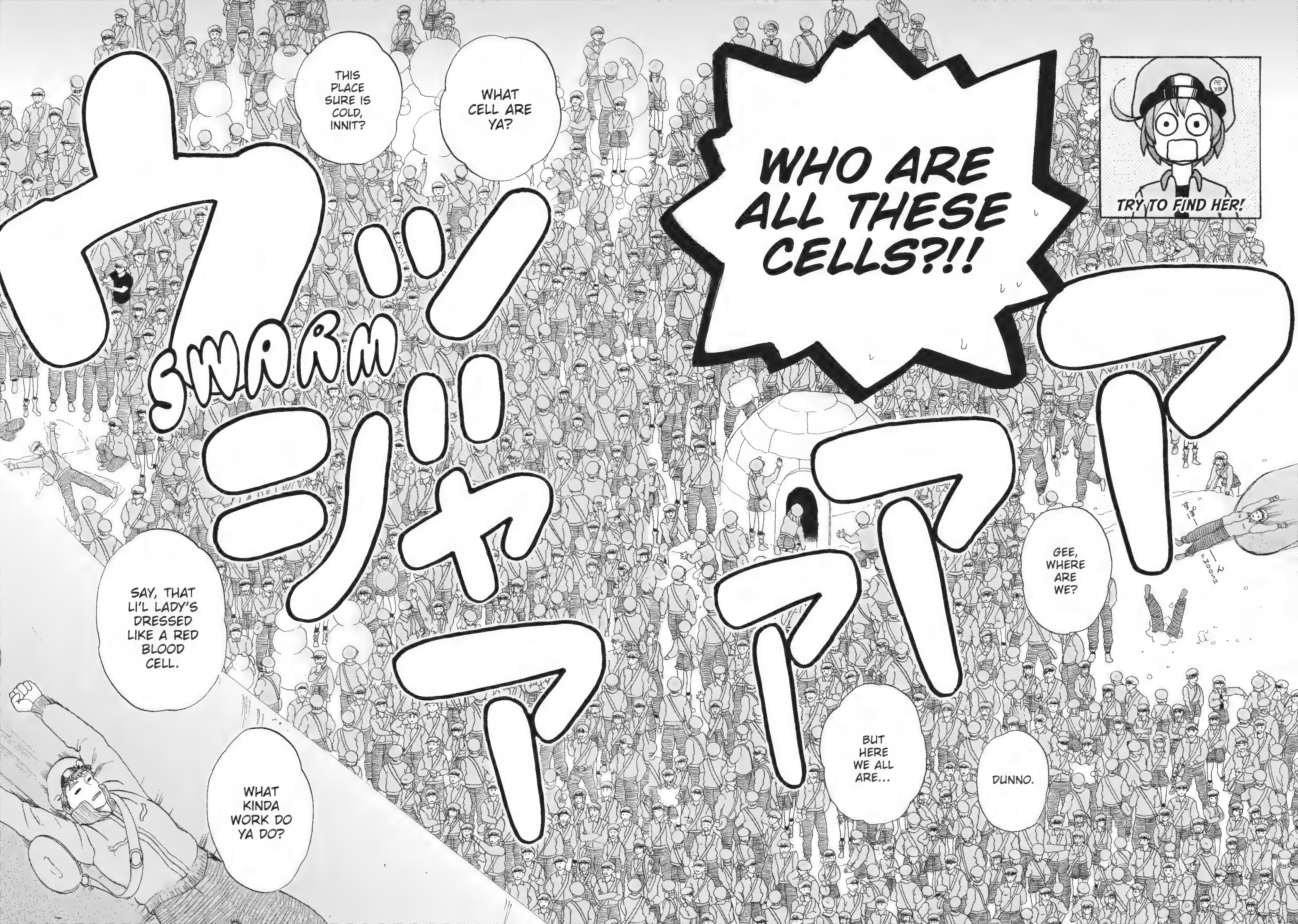

OH...
I SEE...
WHITE BLOOD CELL
1146

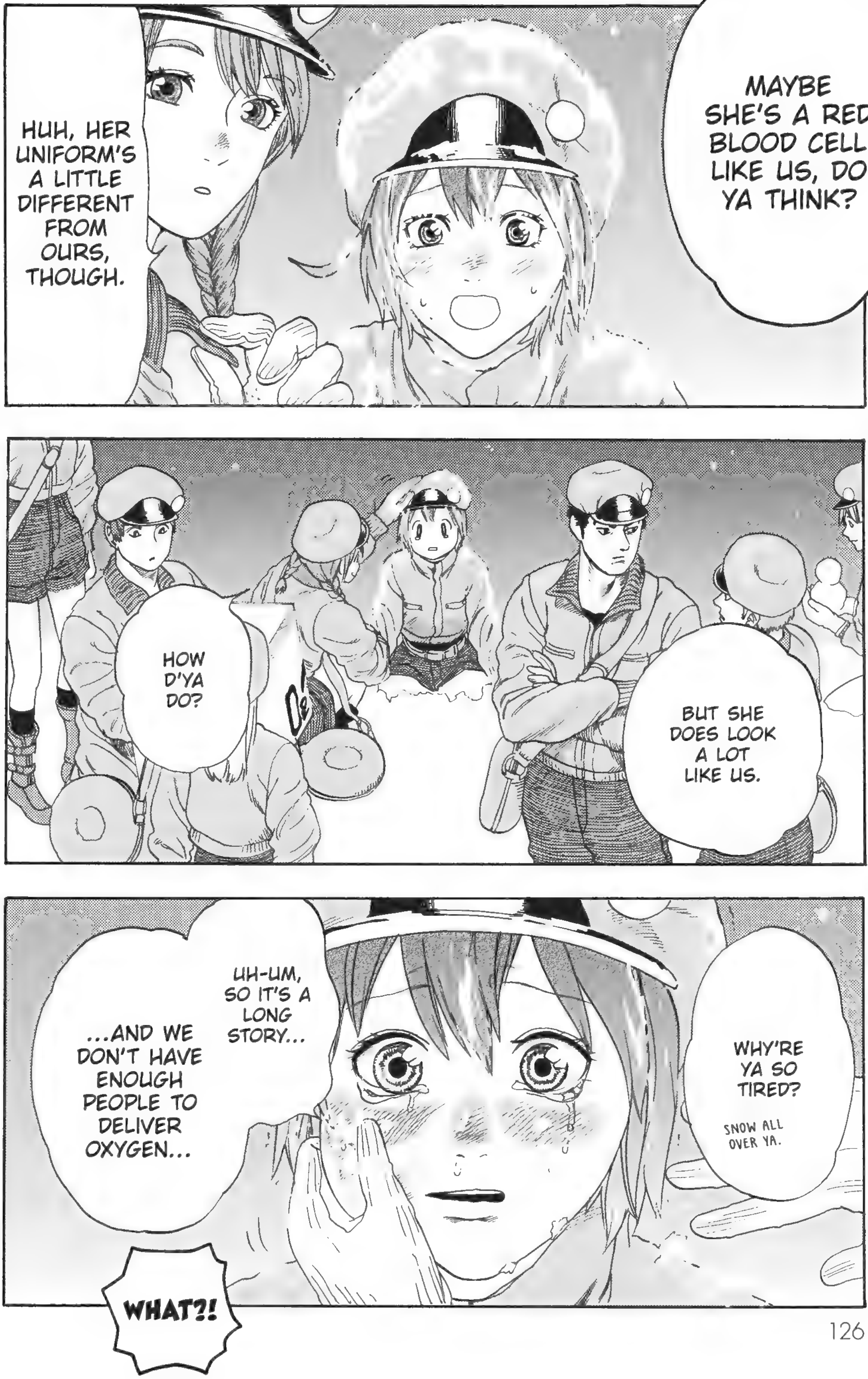
A BRIGHT
LIGHT...

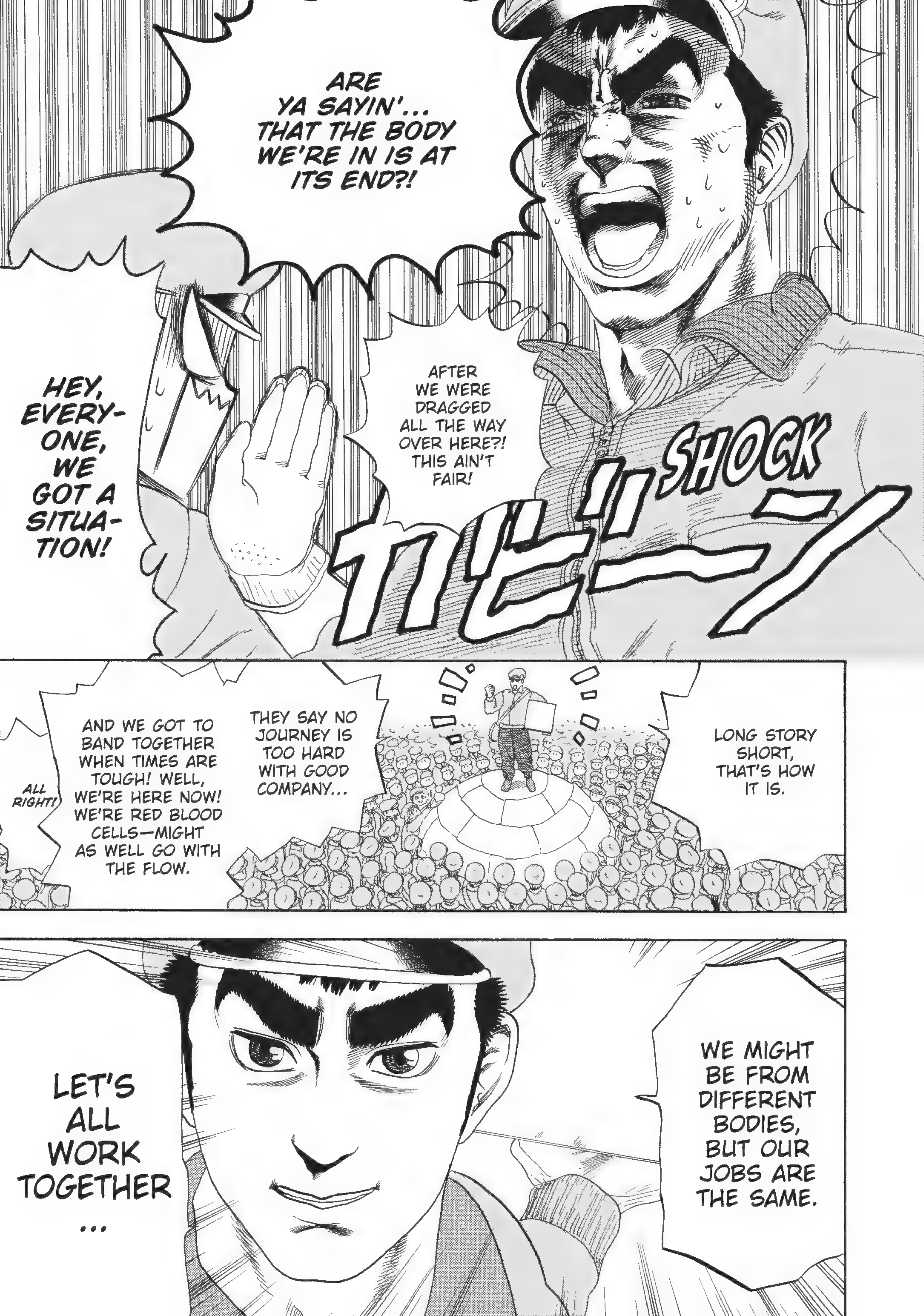

DB 5963
YA OKAY, THERE?

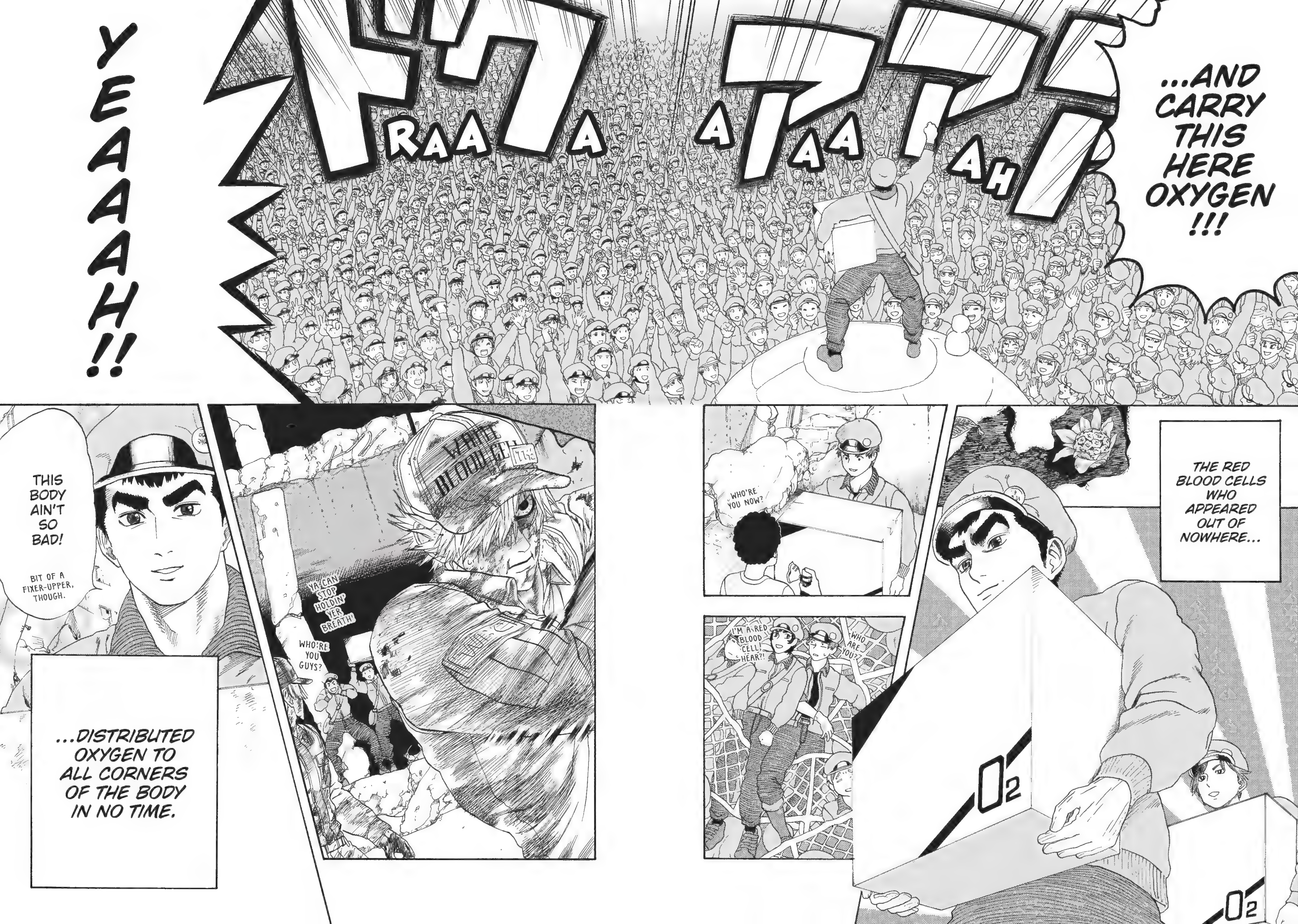

HUH...?
WH—
DB
5963
WH—

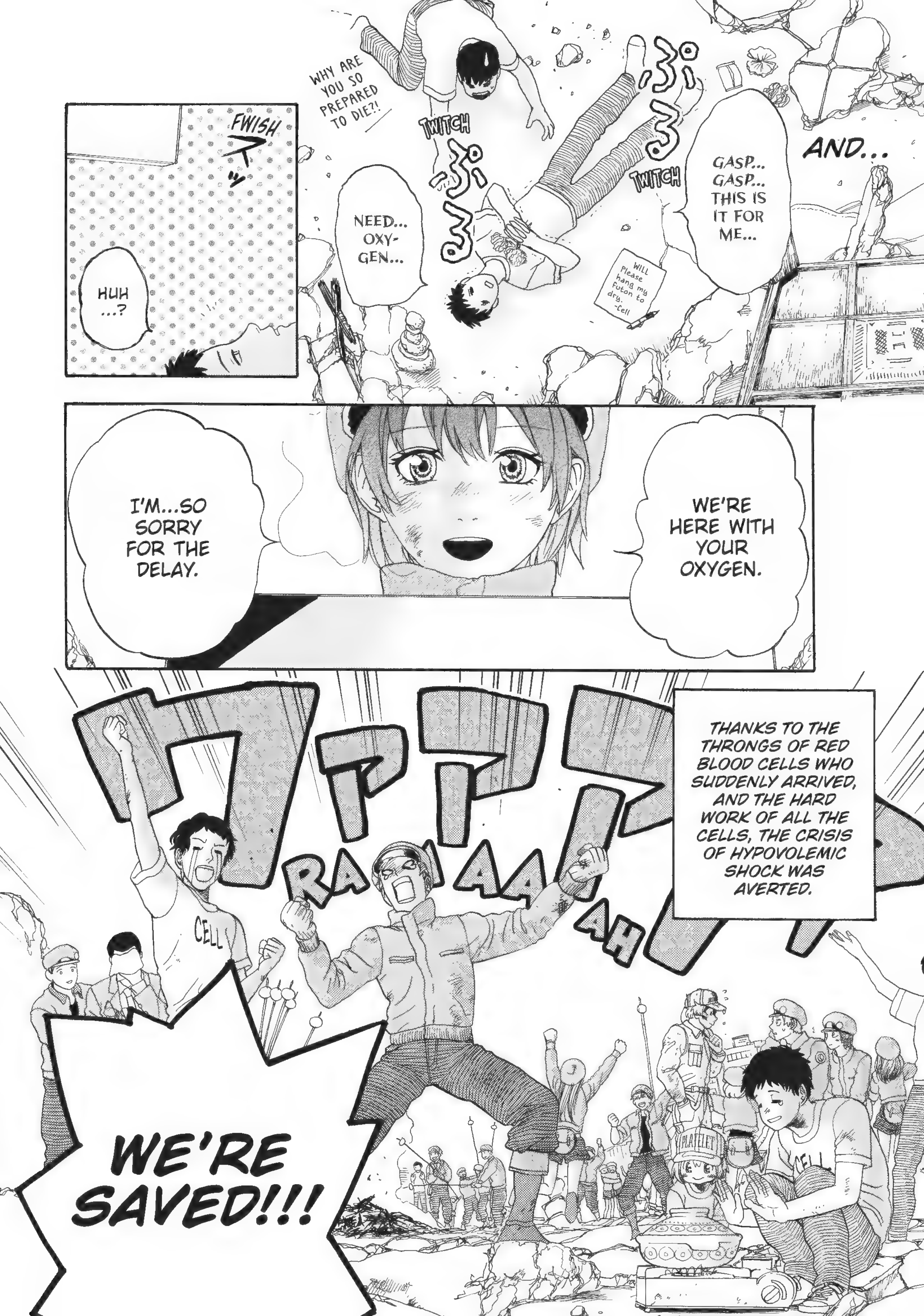

WH–
WH–

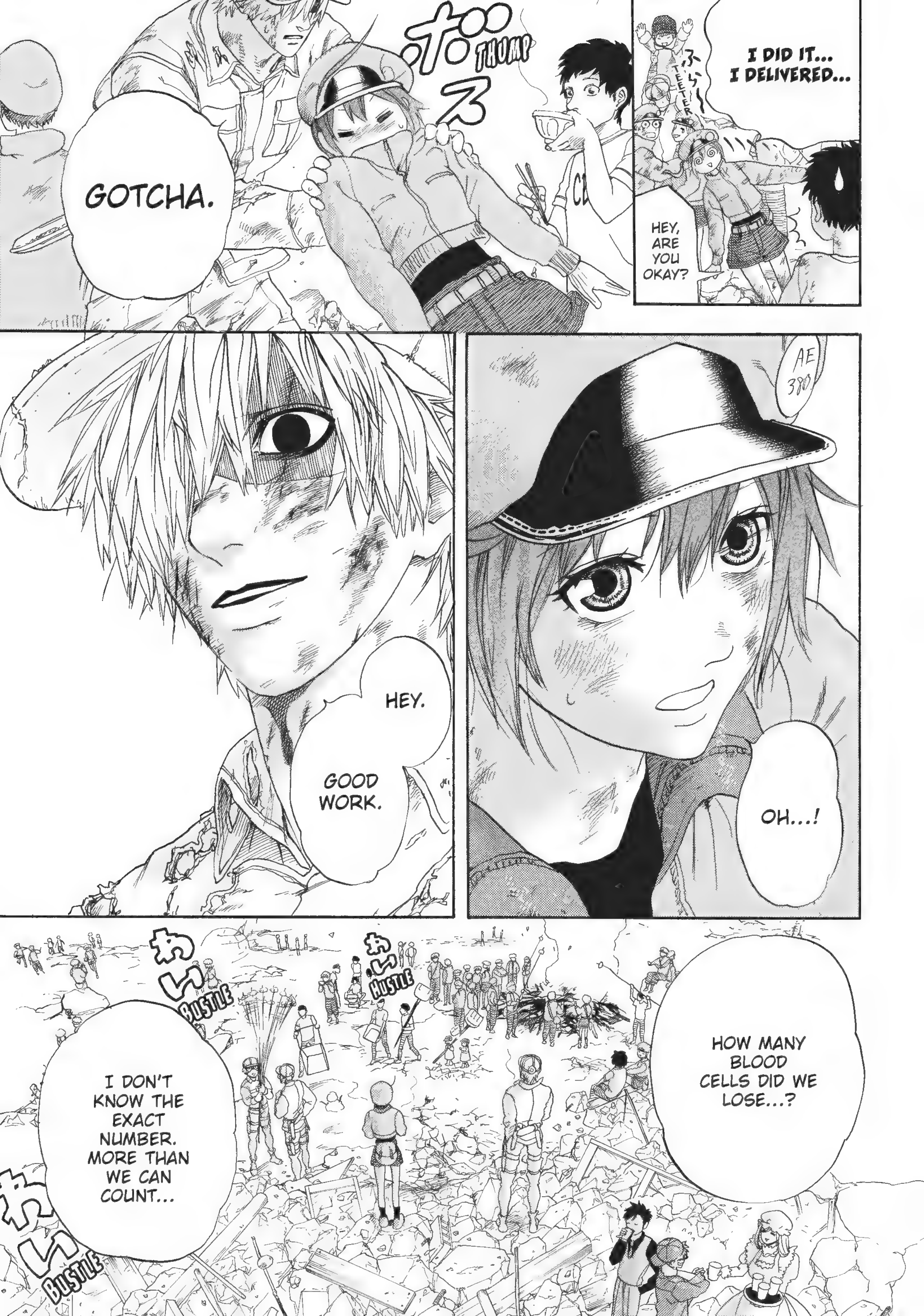

TRY TO FIND HER!
AE3803
WHO ARE ALL THESE CELLS?!!
WHAT CELL ARE YA?
THIS PLACE SURE IS COLD, INNIT?
SWARM
GEE, WHERE ARE WE?
FWOOSH
DUNNO.
BUT HERE WE ALL ARE...
SAY, THAT LI'L LADY'S DRESSED LIKE A RED BLOOD CELL.
WHAT KINDA WORK DO YA DO?

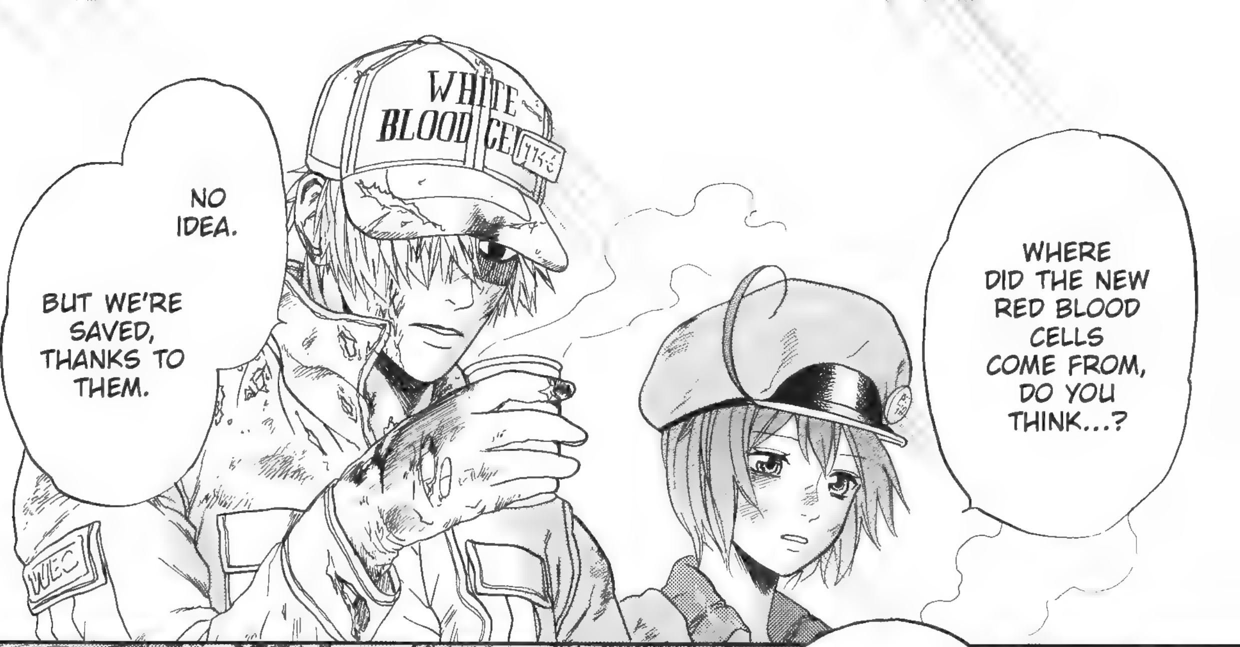

MAYBE SHE'S A RED BLOOD CELL LIKE US, DO YA THINK?
HUH, HER UNIFORM'S A LITTLE DIFFERENT FROM OURS, THOUGH.
BUT SHE DOES LOOK A LOT LIKE US.
HOW D'YA DO?
WHY'RE YA SO TIRED?
SNOW ALL OVER YA.
UH-UM, SO IT'S A LONG STORY...
...AND WE DON'T HAVE ENOUGH PEOPLE TO DELIVER OXYGEN...
WHAT?!

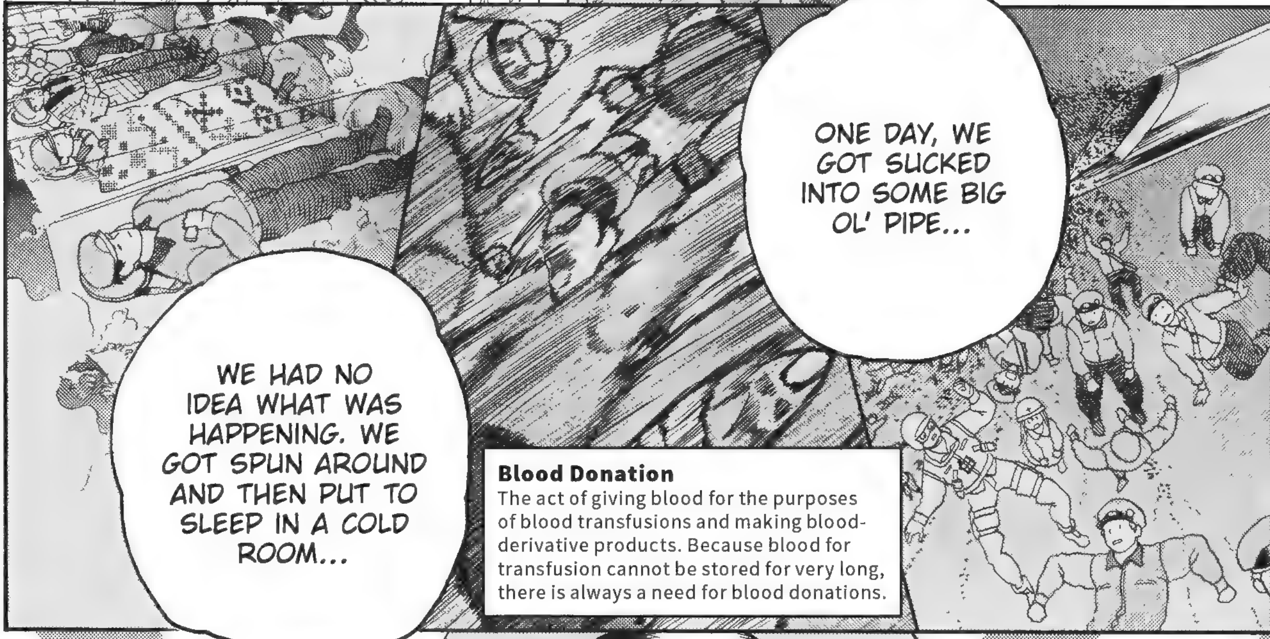

ARE YA SAYIN'... THAT THE BODY WE'RE IN IS AT ITS END?!
AFTER WE WERE DRAGGED ALL THE WAY OVER HERE?! THIS AIN'T FAIR!
カビーン
SHOCK
HEY, EVERYONE, WE GOT A SITUATION!
LONG STORY SHORT, THAT'S HOW IT IS.
THEY SAY NO JOURNEY IS TOO HARD WITH GOOD COMPANY...
AND WE GOT TO BAND TOGETHER WHEN TIMES ARE TOUGH! WELL, WE'RE HERE NOW! WE'RE RED BLOOD CELLS—MIGHT AS WELL GO WITH THE FLOW.
ALL RIGHT!
WE MIGHT BE FROM DIFFERENT BODIES, BUT OUR JOBS ARE THE SAME.
LET'S ALL WORK TOGETHER...


...AND CARRY THIS HERE OXYGEN!!!
RAAAAAAAH
YEAAAAAH!!
THE RED BLOOD CELLS WHO APPEARED OUT OF NOWHERE...
WHO'RE YOU NOW?
WHO ARE YOU?!
I'M A RED BLOOD CELL, HEAR?!
O2
O2
YA CAN STOP HOLDIN' YER BREATH!
WHO'RE YOU GUYS?
WHITE BLOOD CELL
THIS BODY AIN'T SO BAD!
BIT OF A FIXER-UPPER, THOUGH.
...DISTRIBUTED OXYGEN TO ALL CORNERS OF THE BODY IN NO TIME.

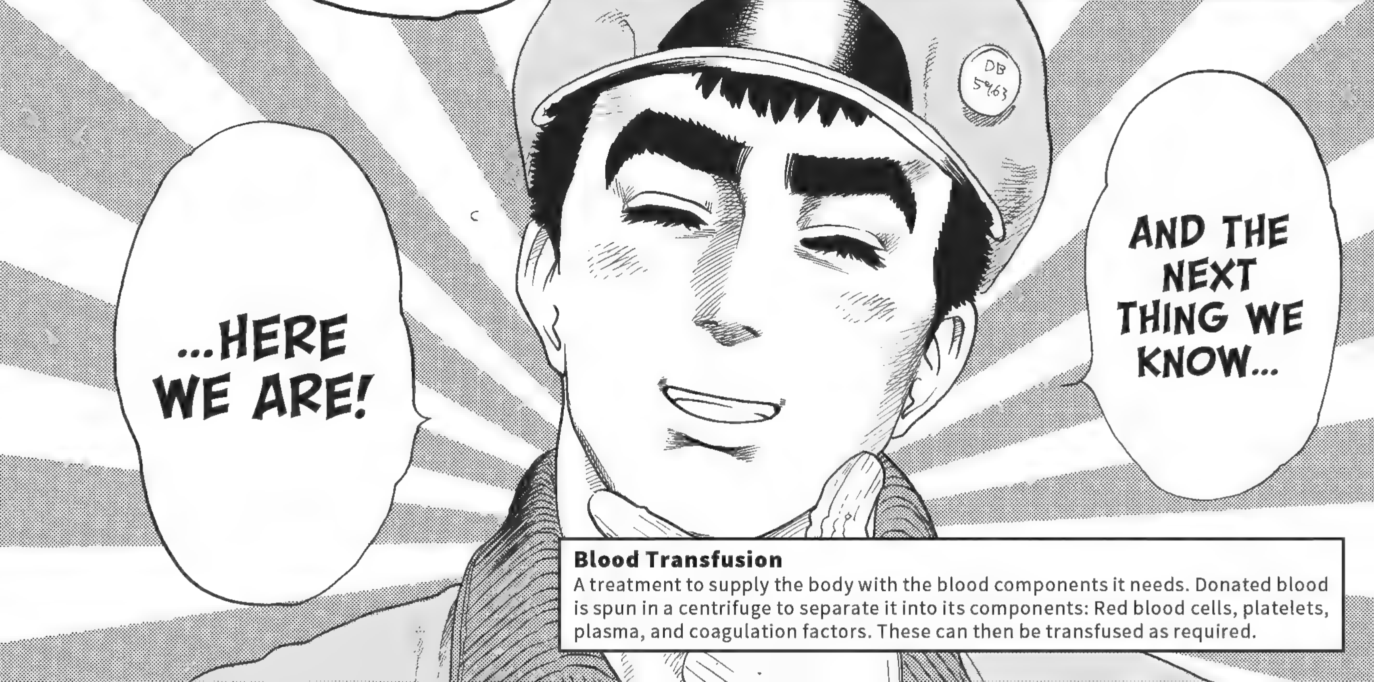

AND...
GASP... GASP... THIS IS IT FOR ME...
TWITCH
ぷるぷる
WILL
Please hang my Futon to dry.
-Cell
NEED... OXYGEN...
TWITCH
ぷるぷる
WHY ARE YOU SO PREPARED TO DIE?!
FWISH
HUH ...?
WE'RE HERE WITH YOUR OXYGEN.
I'M...SO SORRY FOR THE DELAY.
THANKS TO THE THRONGS OF RED BLOOD CELLS WHO SUDDENLY ARRIVED, AND THE HARD WORK OF ALL THE CELLS, THE CRISIS OF HYPOVOLEMIC SHOCK WAS AVERTED.
ワァァー
RAAAAAH
CELL
PLATELET
CELL
WE'RE SAVED!!!


I DID IT... I DELIVERED...
ふら〜 TEETER
HEY, ARE YOU OKAY?
ポス THUMP
GOTCHA.
AE 380
OH...!
HEY.
GOOD WORK.
HOW MANY BLOOD CELLS DID WE LOSE...?
わい HUSTLE
わい BUSTLE
I DON'T KNOW THE EXACT NUMBER. MORE THAN WE CAN COUNT...
わい BUSTLE

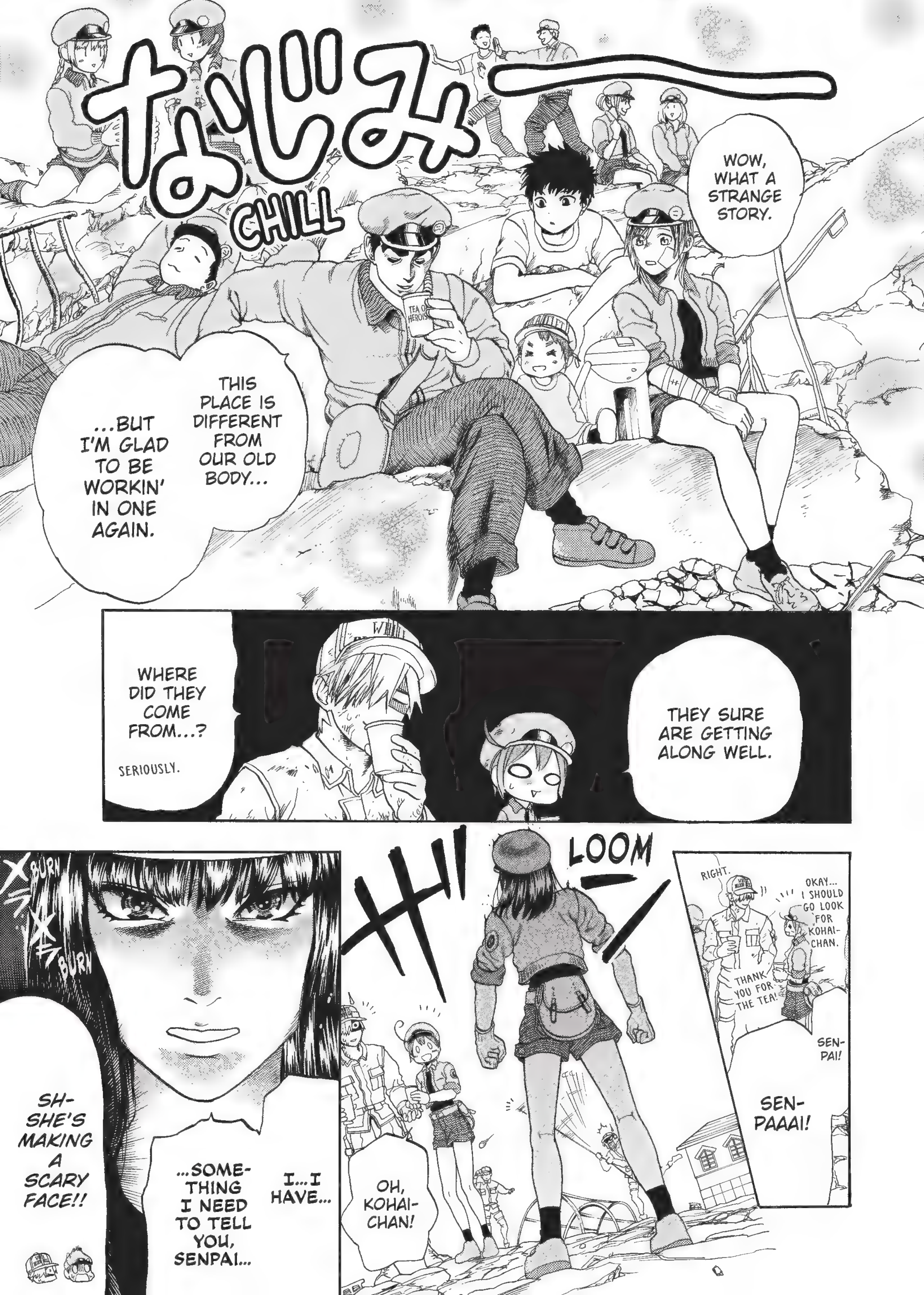

WHERE DID THE NEW RED BLOOD CELLS COME FROM, DO YOU THINK...?
NO IDEA.
BUT WE'RE SAVED, THANKS TO THEM.
WHITE BLOOD CE
1146
WBC

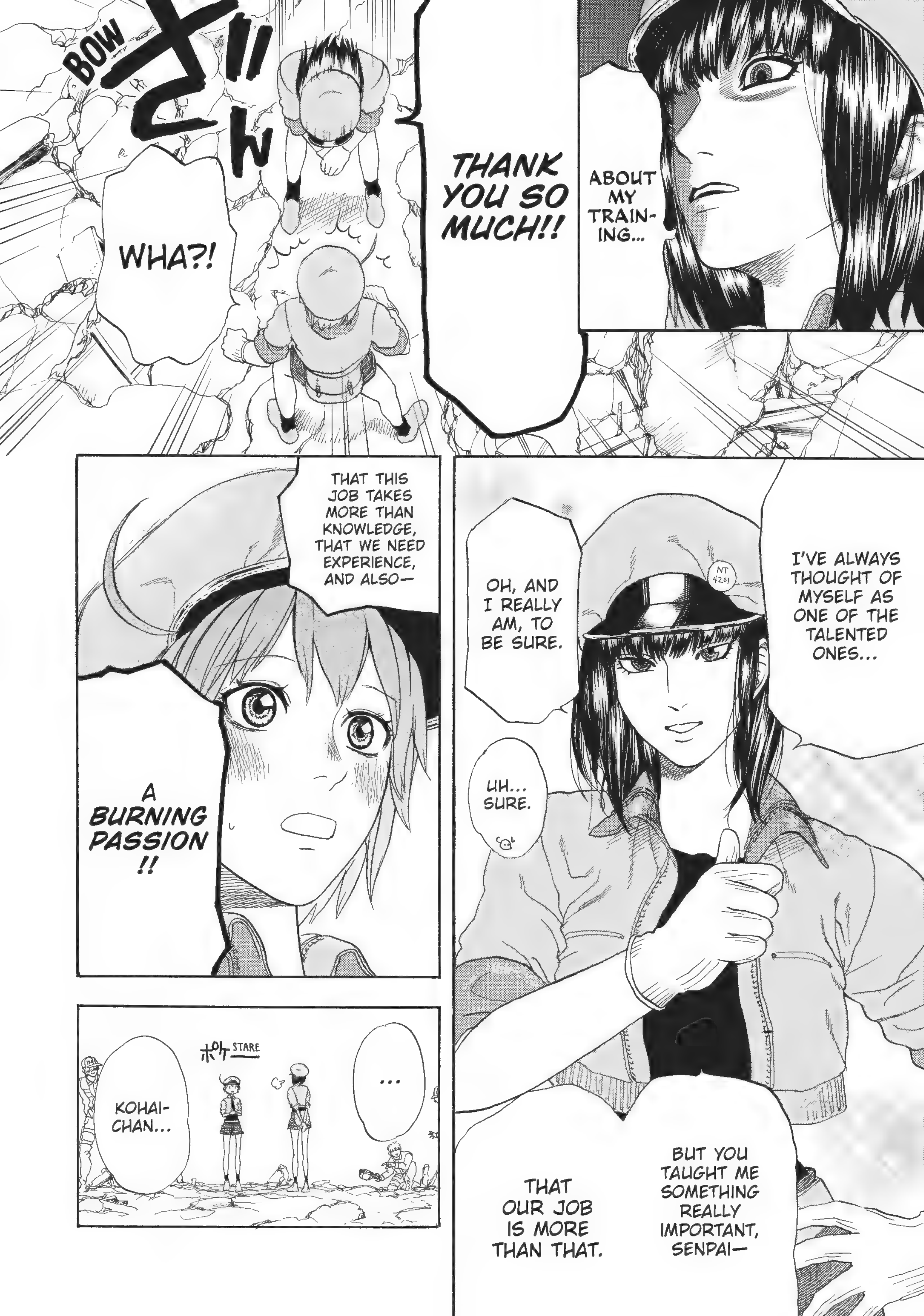

ONE DAY, WE GOT SUCKED INTO SOME BIG OL' PIPE...
WE HAD NO IDEA WHAT WAS HAPPENING. WE GOT SPUN AROUND AND THEN PUT TO SLEEP IN A COLD ROOM...

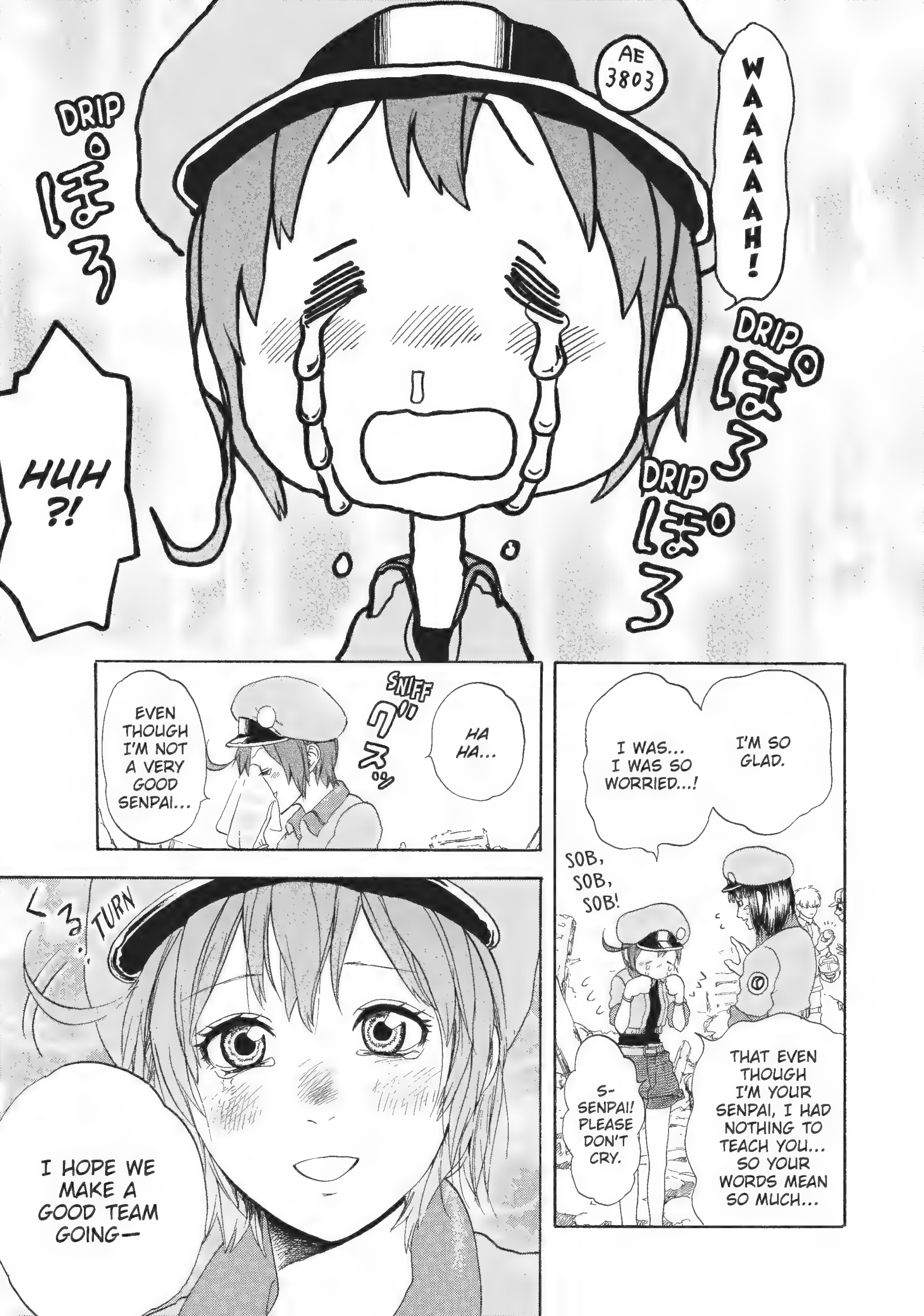
**Blood Donation**
The act of giving blood for the purposes of blood transfusions and making blood-derivative products. Because blood for transfusion cannot be stored for very long, there is always a need for blood donations.

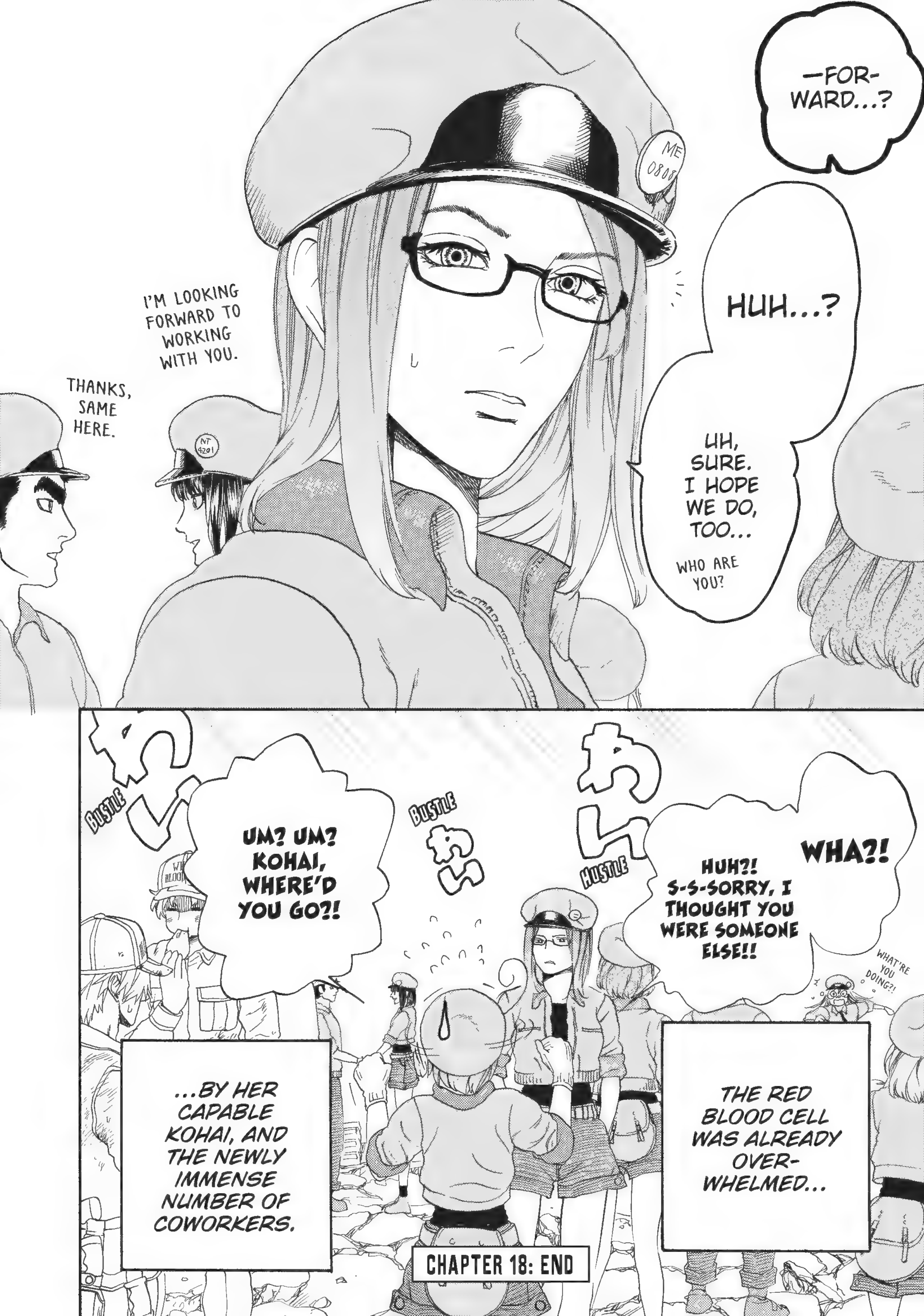

AND THE NEXT THING WE KNOW...
...HERE WE ARE!
DB 5963

**Blood Transfusion**
A treatment to supply the body with the blood components it needs. Donated blood is spun in a centrifuge to separate it into its components: Red blood cells, platelets, plasma, and coagulation factors. These can then be transfused as required.


なじみ〜
CHILL
WOW, WHAT A STRANGE STORY.
THIS PLACE IS DIFFERENT FROM OUR OLD BODY...
...BUT I'M GLAD TO BE WORKIN' IN ONE AGAIN.
TEA OF HEROIS
THEY SURE ARE GETTING ALONG WELL.
WHERE DID THEY COME FROM...?
SERIOUSLY.
OKAY... I SHOULD GO LOOK FOR KOHAI-CHAN.
RIGHT.
THANK YOU FOR THE TEA!
SEN-PAI!
SEN-PAAAI!
LOOM
OH, KOHAI-CHAN!
I...I HAVE...
...SOMETHING I NEED TO TELL YOU, SENPAI...
BURN
BURN
SH-SHE'S MAKING A SCARY FACE!!


ABOUT MY TRAINING...
THANK YOU SO MUCH!!
BOW
ざん
WHA?!
I'VE ALWAYS THOUGHT OF MYSELF AS ONE OF THE TALENTED ONES...
NT 4201
OH, AND I REALLY AM, TO BE SURE.
UH... SURE.
BUT YOU TAUGHT ME SOMETHING REALLY IMPORTANT, SENPAI—
THAT OUR JOB IS MORE THAN THAT.
THAT THIS JOB TAKES MORE THAN KNOWLEDGE, THAT WE NEED EXPERIENCE, AND ALSO—
A BURNING PASSION!!
...
ポケ STARE
KOHAI-CHAN...


AE 3803
WAAAAAAH!
DRIP ぽろ
DRIP ぽろ
DRIP ぽろ
HUH ?!
I'M SO GLAD.
I WAS... I WAS SO WORRIED...!
SOB, SOB, SOB!
S-SENPAI! PLEASE DON'T CRY.
THAT EVEN THOUGH I'M YOUR SENPAI, I HAD NOTHING TO TEACH YOU... SO YOUR WORDS MEAN SO MUCH...
HA HA...
SNIFF グスッ
EVEN THOUGH I'M NOT A VERY GOOD SENPAI...
くる TURN
I HOPE WE MAKE A GOOD TEAM GOING—

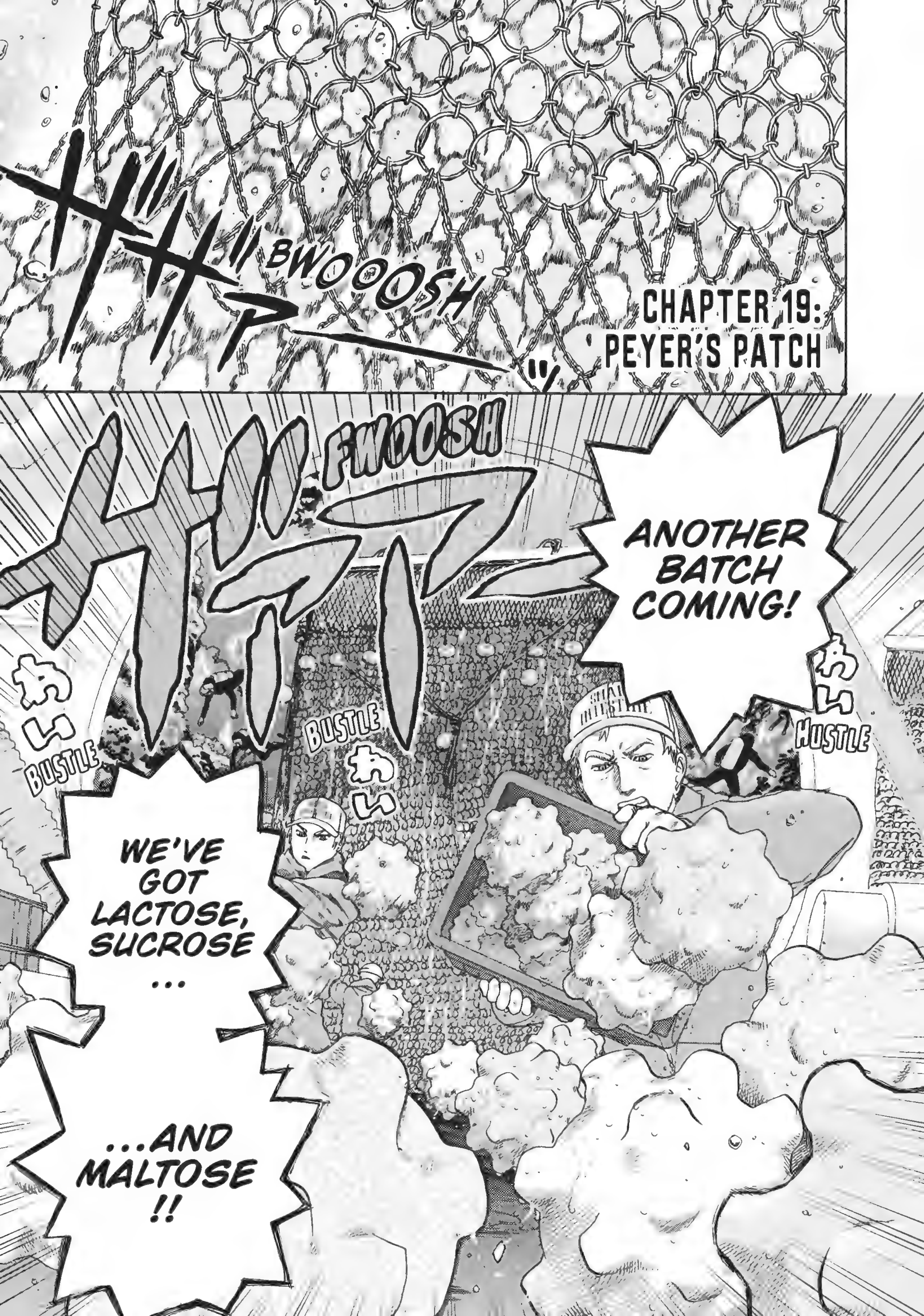

—FOR-WARD...?
ME 0808
HUH...?
UH, SURE. I HOPE WE DO, TOO...
WHO ARE YOU?
I'M LOOKING FORWARD TO WORKING WITH YOU.
NT 4201
THANKS, SAME HERE.
THE RED BLOOD CELL WAS ALREADY OVER-WHELMED...
WHAT'RE YOU DOING?!
WHA?!
HUH?! S-S-SORRY, I THOUGHT YOU WERE SOMEONE ELSE!!
わい
HUSTLE
わい
BUSTLE
UM? UM? KOHAI, WHERE'D YOU GO?!
わい
BUSTLE
...BY HER CAPABLE KOHAI, AND THE NEWLY IMMENSE NUMBER OF COWORKERS.
CHAPTER 18: END

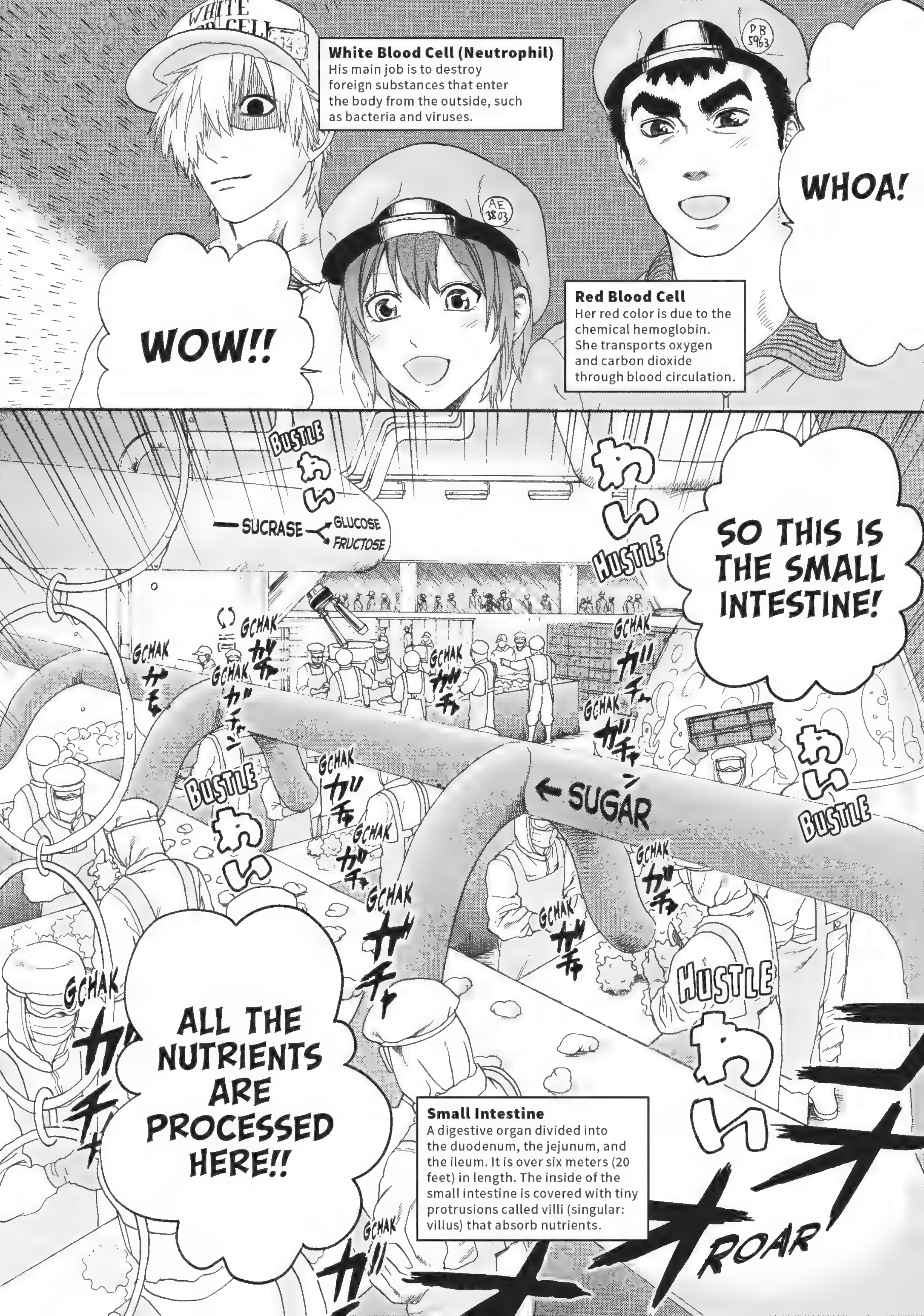
AE
3803

Cells at Work!

はたらく細胞

# CHAPTER 19: PEYER'S PATCH


BWOOOSH
FWOOSH
ANOTHER BATCH COMING!
わい
HUSTLE
BUSTLE
わい
BUSTLE
わい
WE'VE GOT LACTOSE, SUCROSE ...
...AND MALTOSE !!

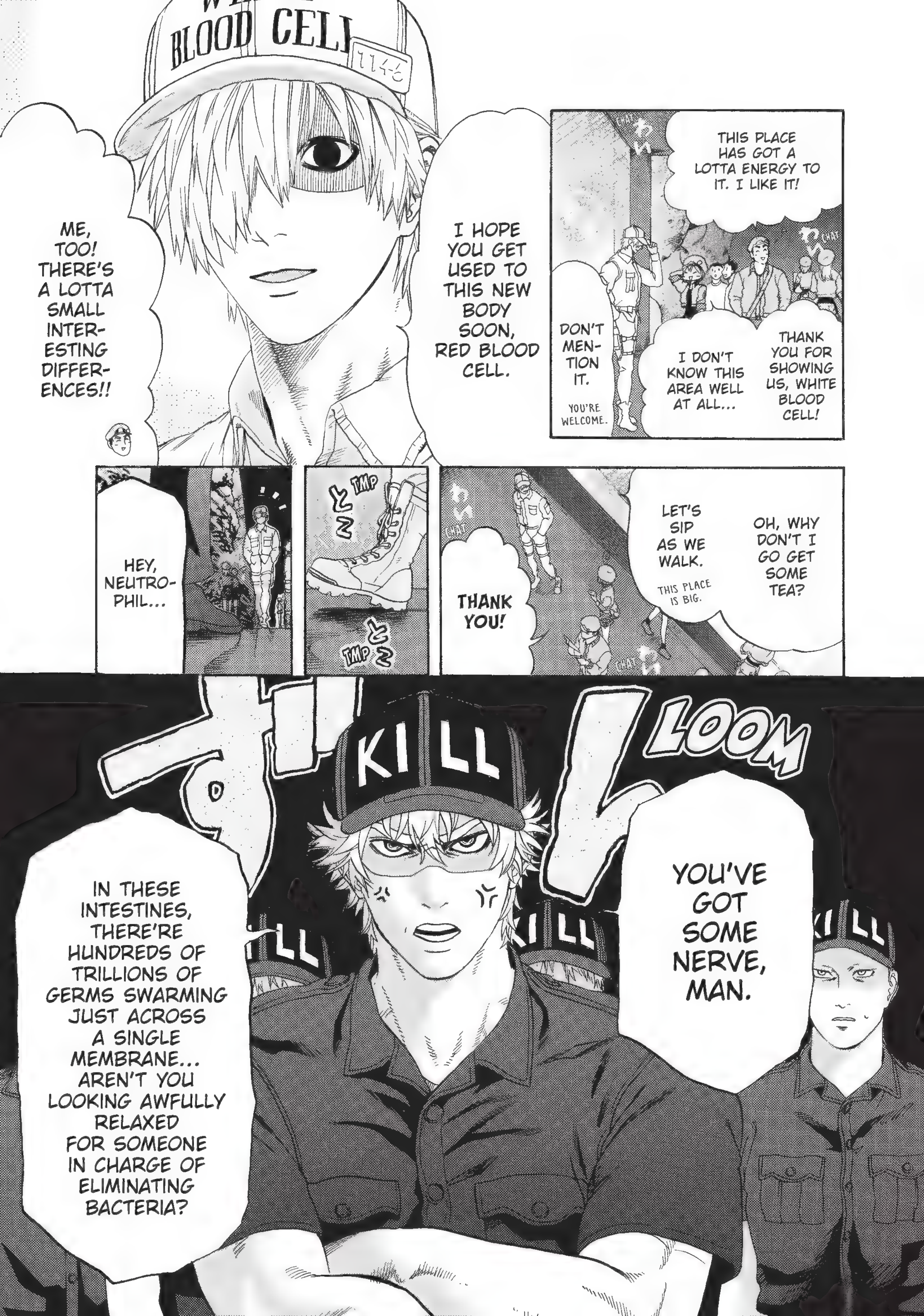


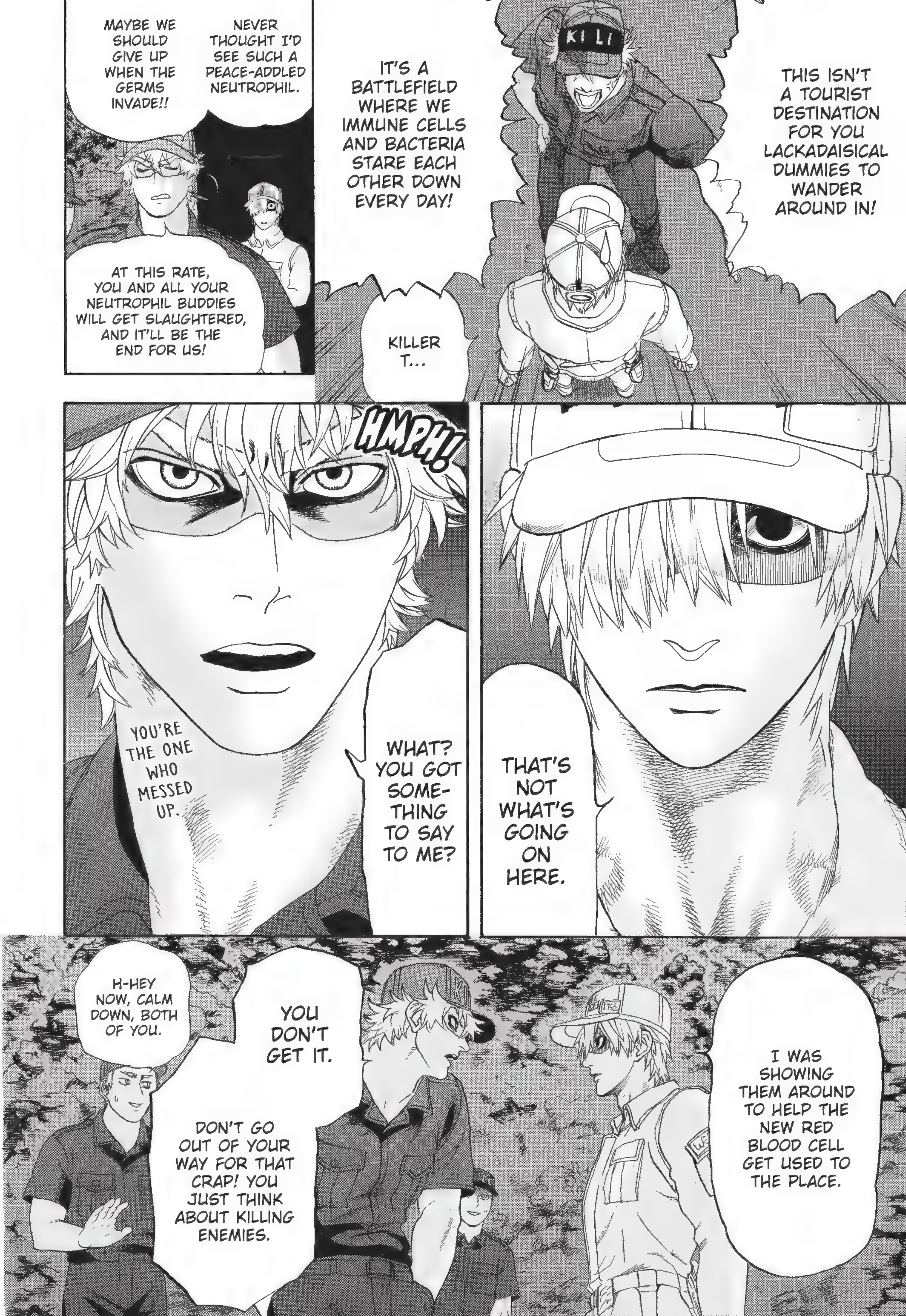
DB 5963
WHOA!
AE 3803
WHITE BLOOD CELL
WOW!!
SO THIS IS THE SMALL INTESTINE!
BUSTLE わい
HUSTLE わい
SUCRASE
GLUCOSE
FRUCTOSE
GCHAK ガチャ
SUGAR
BUSTLE わい
ALL THE NUTRIENTS ARE PROCESSED HERE!!
HUSTLE わい
ROAR

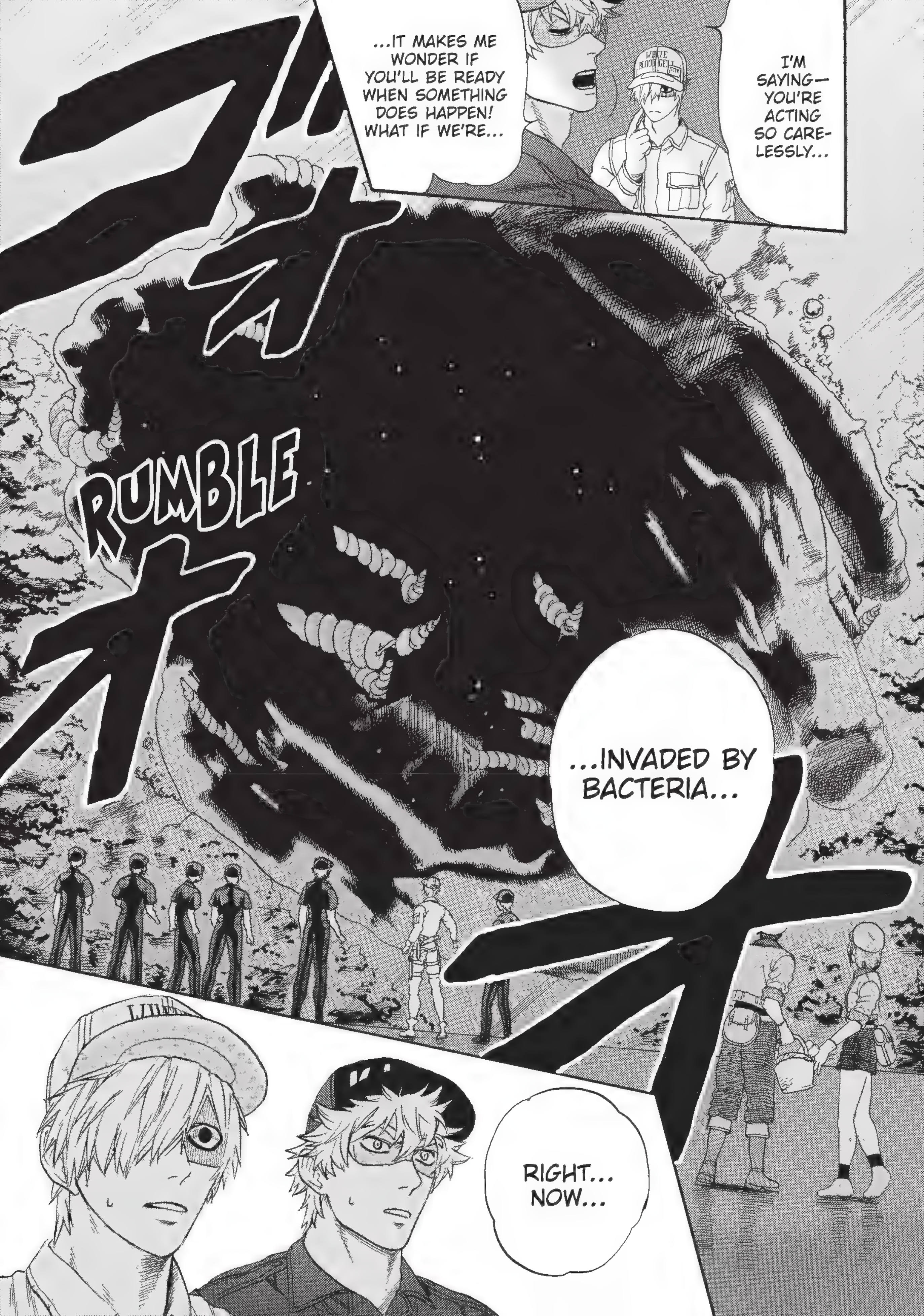
**White Blood Cell (Neutrophil)**
His main job is to destroy foreign substances that enter the body from the outside, such as bacteria and viruses.

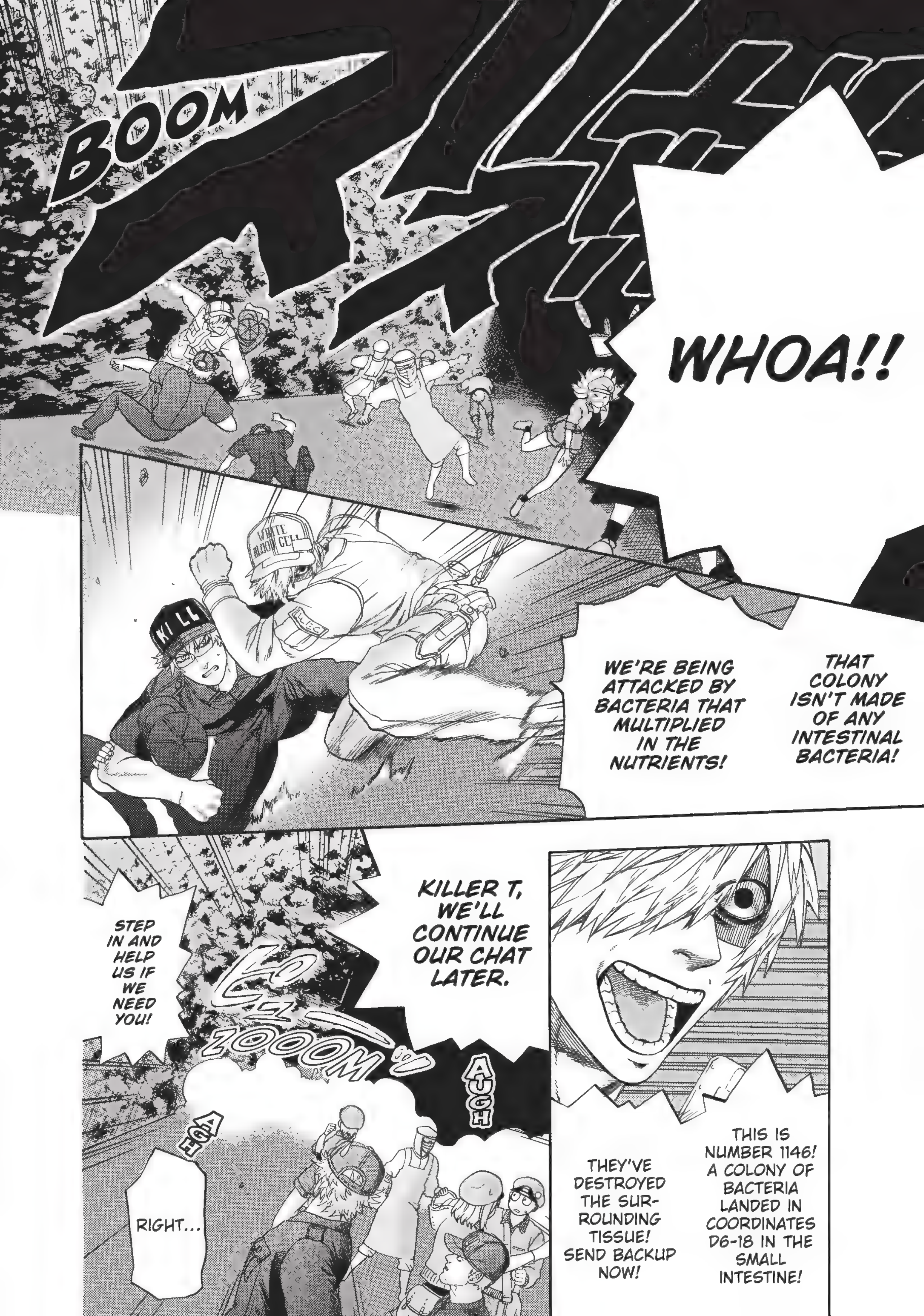
**Red Blood Cell**
Her red color is due to the chemical hemoglobin. She transports oxygen and carbon dioxide through blood circulation.

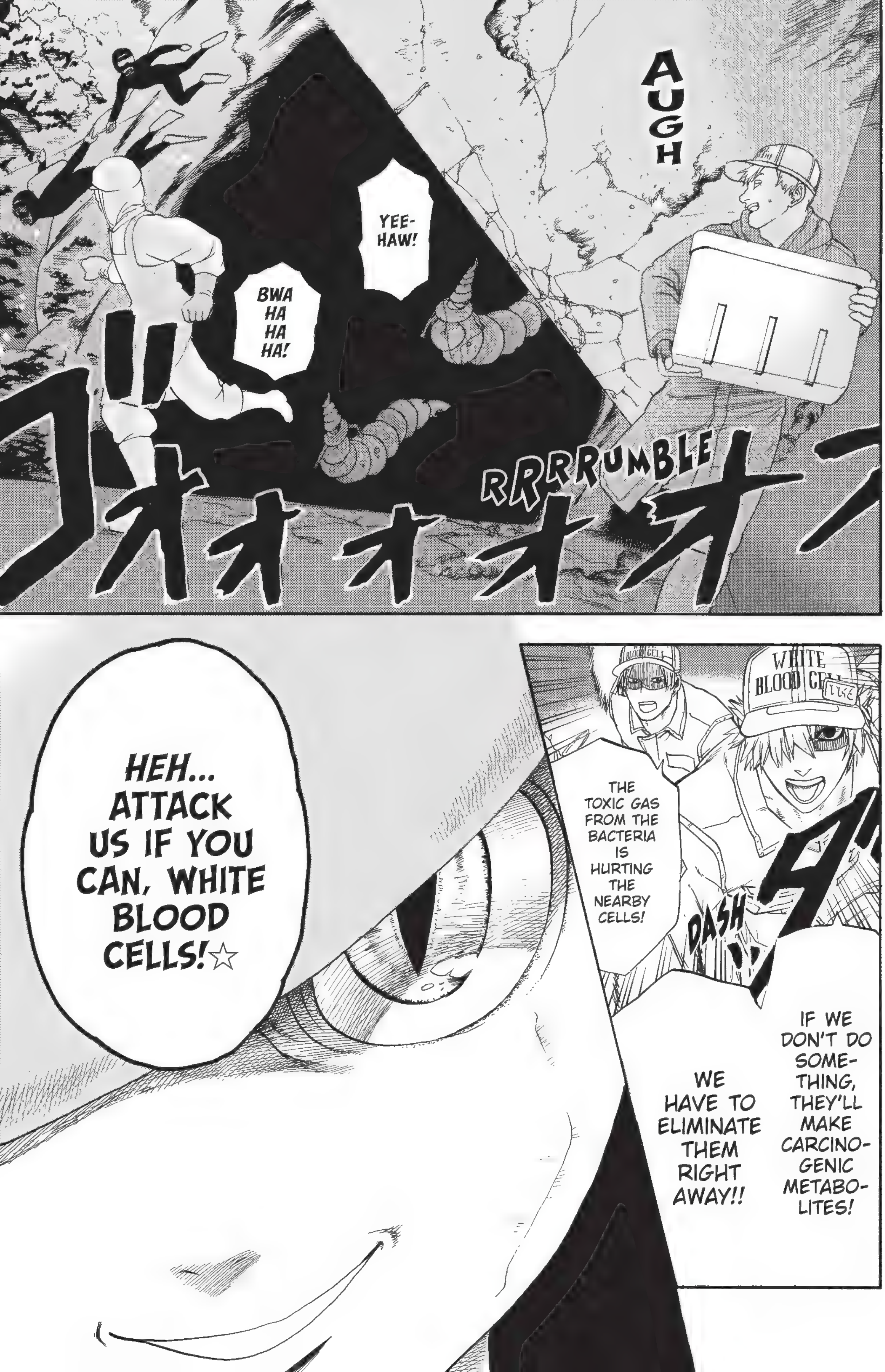
**Small Intestine**
A digestive organ divided into the duodenum, the jejunum, and the ileum. It is over six meters (20 feet) in length. The inside of the small intestine is covered with tiny protrusions called villi (singular: villus) that absorb nutrients.

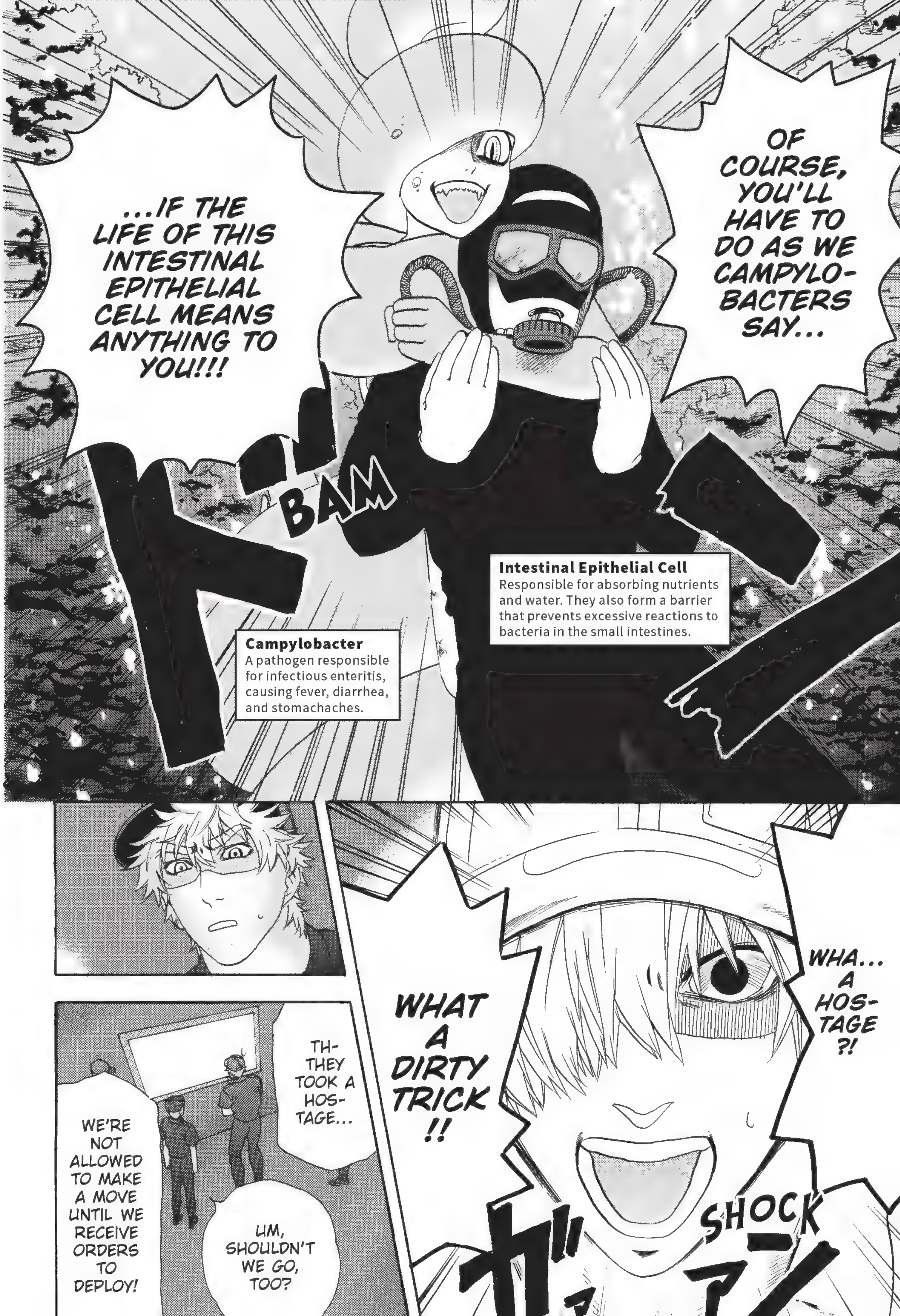

BLOOD CELL
1146
CHAT
THIS PLACE HAS GOT A LOTTA ENERGY TO IT. I LIKE IT!
CHAT
THANK YOU FOR SHOWING US, WHITE BLOOD CELL!
I DON'T KNOW THIS AREA WELL AT ALL...
DON'T MENTION IT.
YOU'RE WELCOME.
I HOPE YOU GET USED TO THIS NEW BODY SOON, RED BLOOD CELL.
ME, TOO! THERE'S A LOTTA SMALL INTERESTING DIFFERENCES!!
OH, WHY DON'T I GO GET SOME TEA?
LET'S SIP AS WE WALK.
THIS PLACE IS BIG.
CHAT
THANK YOU!
CHAT
TMP
TMP
HEY, NEUTROPHIL...
LOOM
KILL
YOU'VE GOT SOME NERVE, MAN.
IN THESE INTESTINES, THERE'RE HUNDREDS OF TRILLIONS OF GERMS SWARMING JUST ACROSS A SINGLE MEMBRANE... AREN'T YOU LOOKING AWFULLY RELAXED FOR SOMEONE IN CHARGE OF ELIMINATING BACTERIA?


THIS ISN'T A TOURIST DESTINATION FOR YOU LACKADAISICAL DUMMIES TO WANDER AROUND IN!
IT'S A BATTLEFIELD WHERE WE IMMUNE CELLS AND BACTERIA STARE EACH OTHER DOWN EVERY DAY!
KILLER T...
NEVER THOUGHT I'D SEE SUCH A PEACE-ADDLED NEUTROPHIL.
MAYBE WE SHOULD GIVE UP WHEN THE GERMS INVADE!!
AT THIS RATE, YOU AND ALL YOUR NEUTROPHIL BUDDIES WILL GET SLAUGHTERED, AND IT'LL BE THE END FOR US!
THAT'S NOT WHAT'S GOING ON HERE.
HMPH!
WHAT? YOU GOT SOMETHING TO SAY TO ME?
YOU'RE THE ONE WHO MESSED UP.
I WAS SHOWING THEM AROUND TO HELP THE NEW RED BLOOD CELL GET USED TO THE PLACE.
YOU DON'T GET IT.
DON'T GO OUT OF YOUR WAY FOR THAT CRAP! YOU JUST THINK ABOUT KILLING ENEMIES.
H-HEY NOW, CALM DOWN, BOTH OF YOU.


I'M SAYING— YOU'RE ACTING SO CARELESSLY...
WHITE BLOOD CELL
...IT MAKES ME WONDER IF YOU'LL BE READY WHEN SOMETHING DOES HAPPEN! WHAT IF WE'RE...
RUMBLE
...INVADED BY BACTERIA...
RIGHT... NOW...


WHOA!!
BOOM
WHITE BLOOD CELL
KILL
THAT COLONY ISN'T MADE OF ANY INTESTINAL BACTERIA!
WE'RE BEING ATTACKED BY BACTERIA THAT MULTIPLIED IN THE NUTRIENTS!
THIS IS NUMBER 1146! A COLONY OF BACTERIA LANDED IN COORDINATES D6-18 IN THE SMALL INTESTINE!
THEY'VE DESTROYED THE SURROUNDING TISSUE! SEND BACKUP NOW!
KILLER T, WE'LL CONTINUE OUR CHAT LATER.
STEP IN AND HELP US IF WE NEED YOU!
ZOOOM
AUGH
AGH
RIGHT...

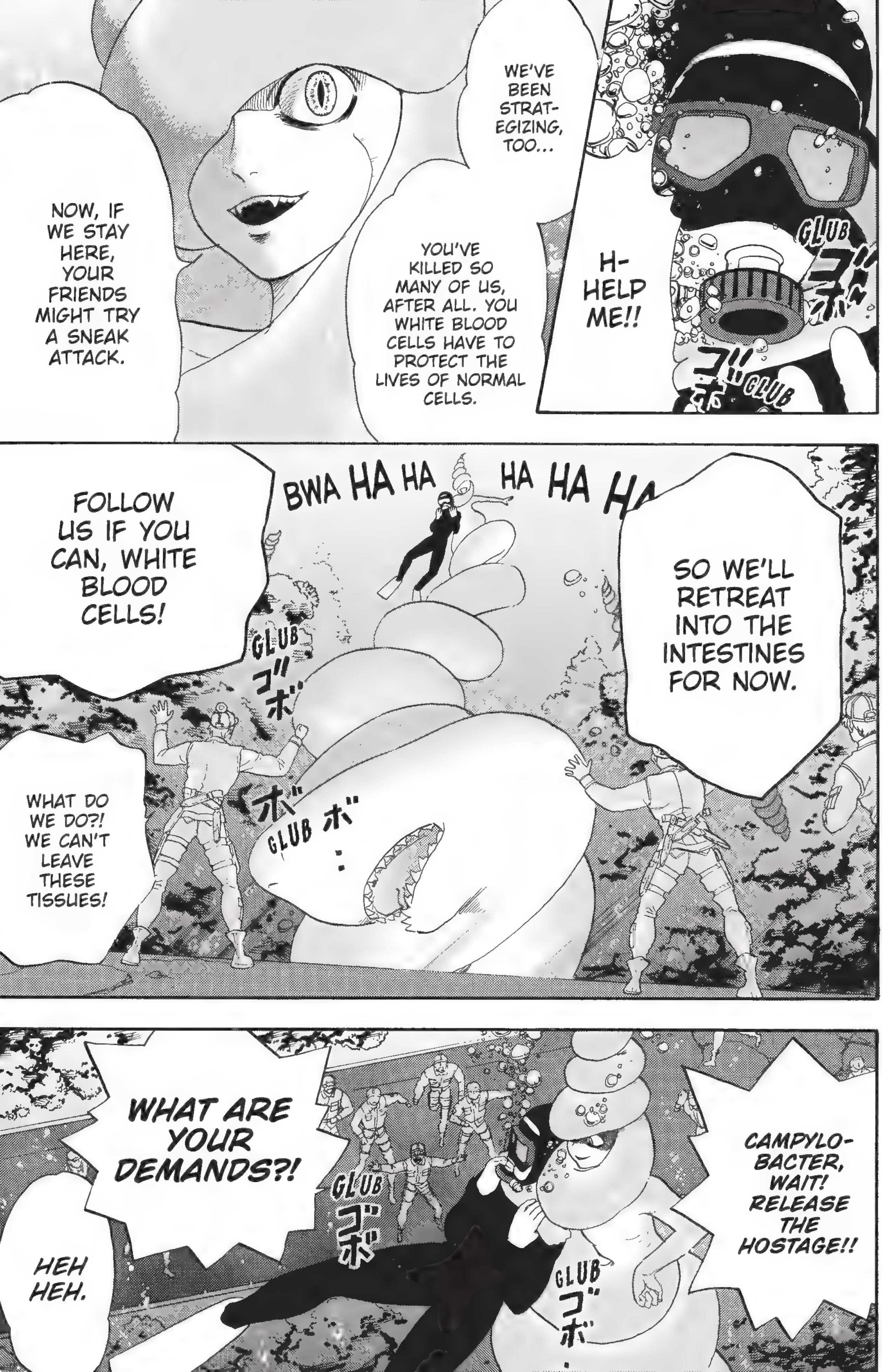

AUGH
YEE-HAW!
BWA HA HA HA!
RRRRUMBLE
WHITE BLOOD CELL
THE TOXIC GAS FROM THE BACTERIA IS HURTING THE NEARBY CELLS!
DASH
IF WE DON'T DO SOMETHING, THEY'LL MAKE CARCINOGENIC METABOLITES!
WE HAVE TO ELIMINATE THEM RIGHT AWAY!!
HEH... ATTACK US IF YOU CAN, WHITE BLOOD CELLS!☆

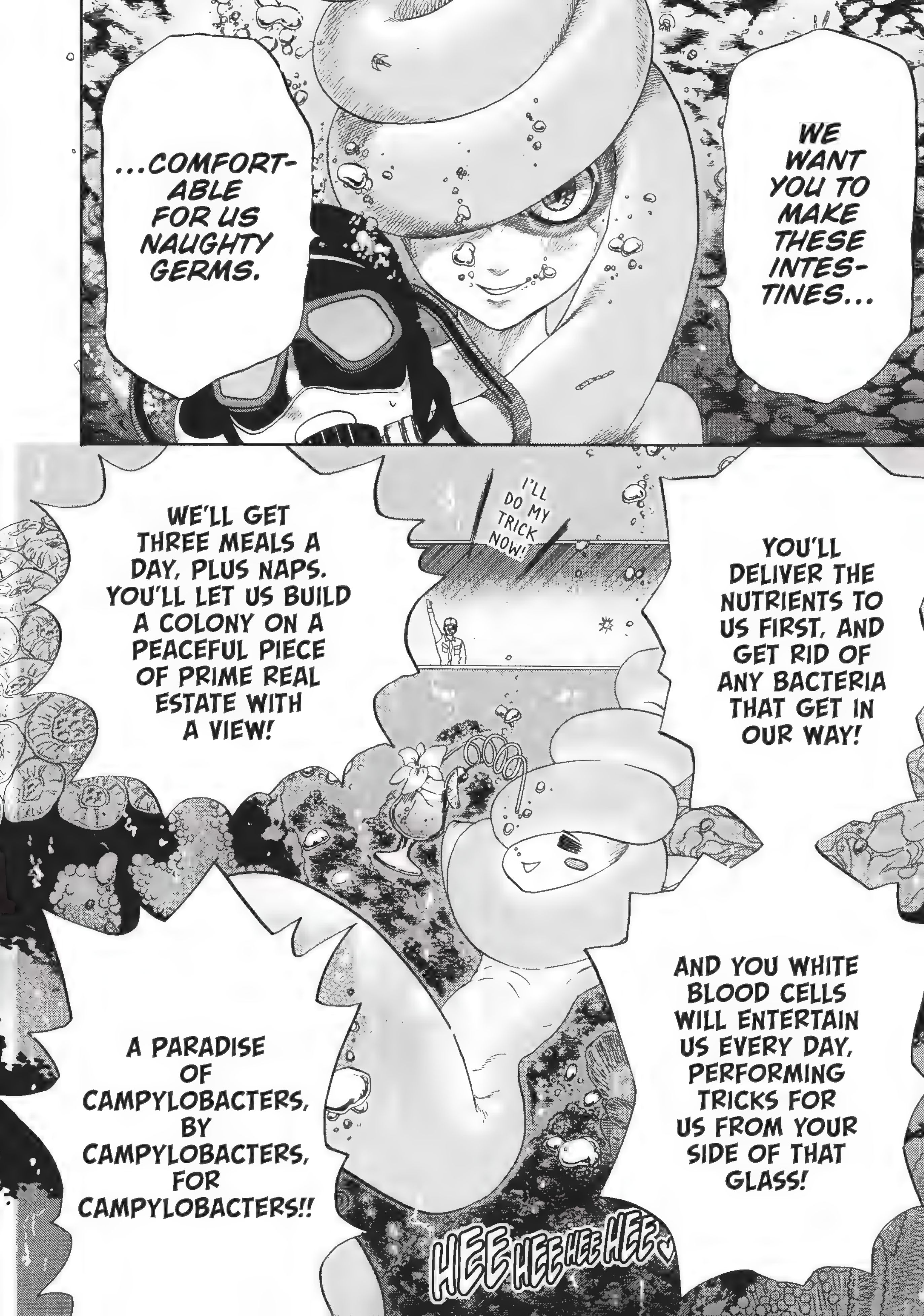


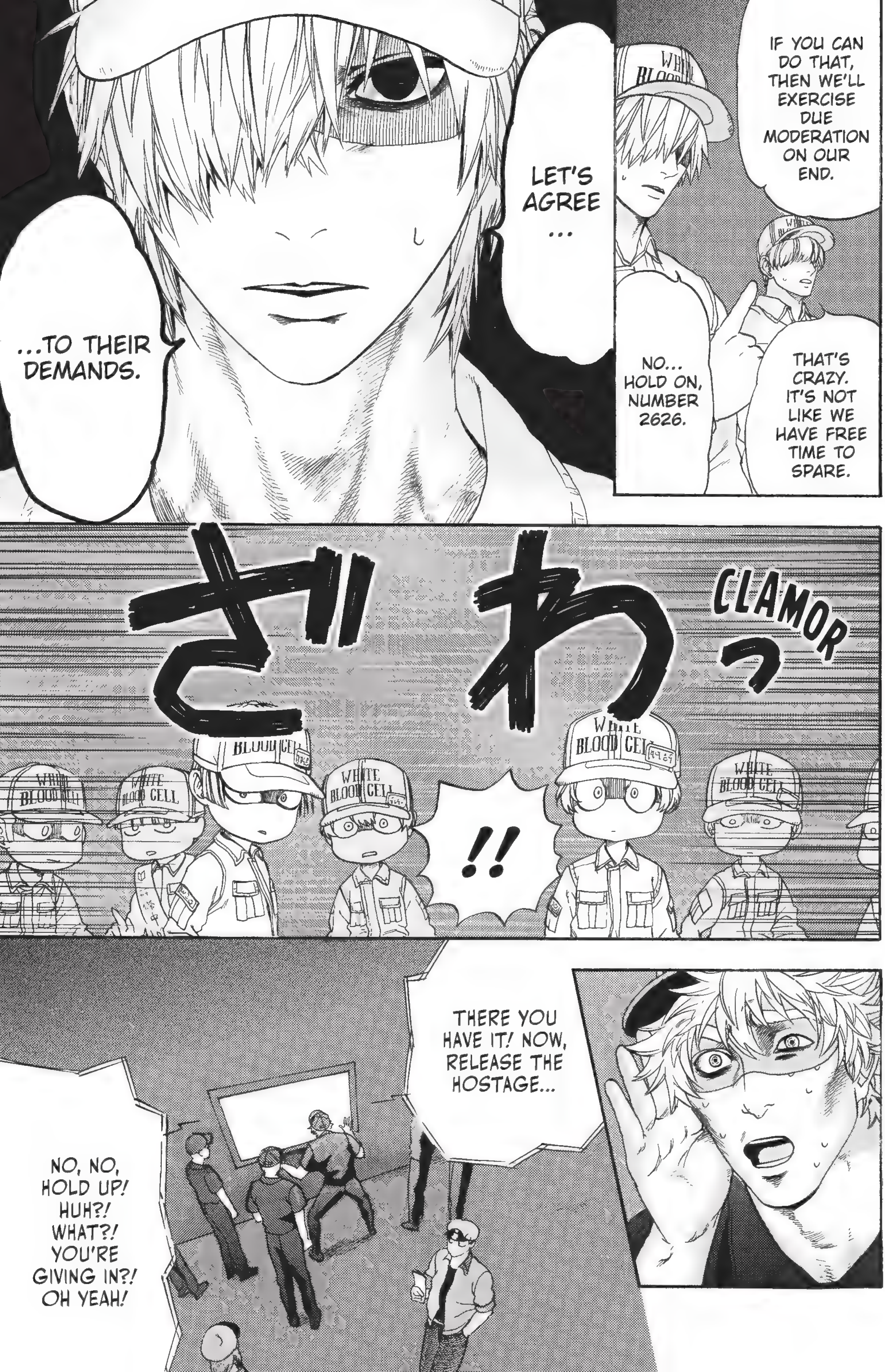
**Intestinal Epithelial Cell**
Responsible for absorbing nutrients and water. They also form a barrier that prevents excessive reactions to bacteria in the small intestines.

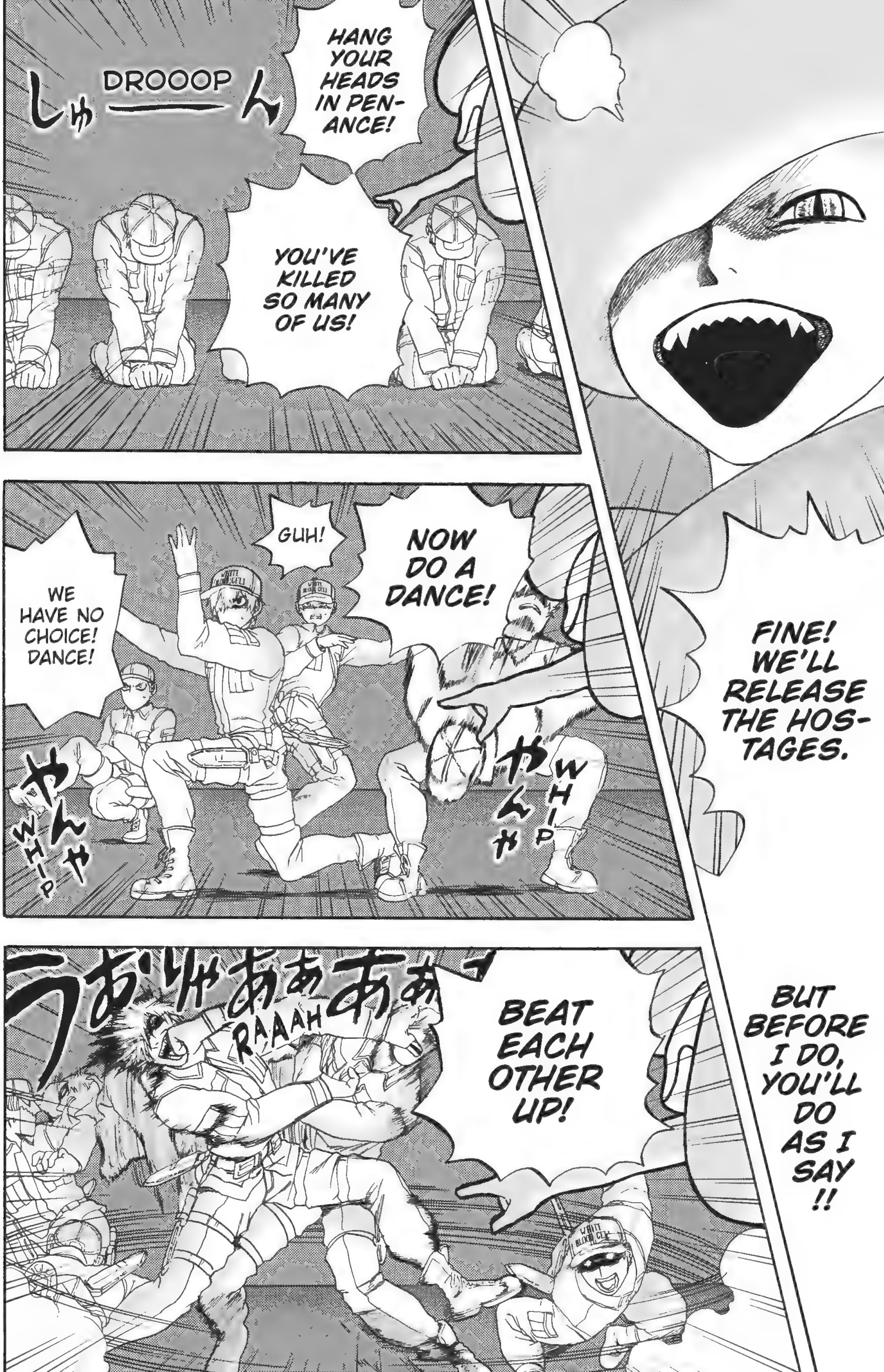
**Campylobacter**
A pathogen responsible for infectious enteritis, causing fever, diarrhea, and stomachaches.

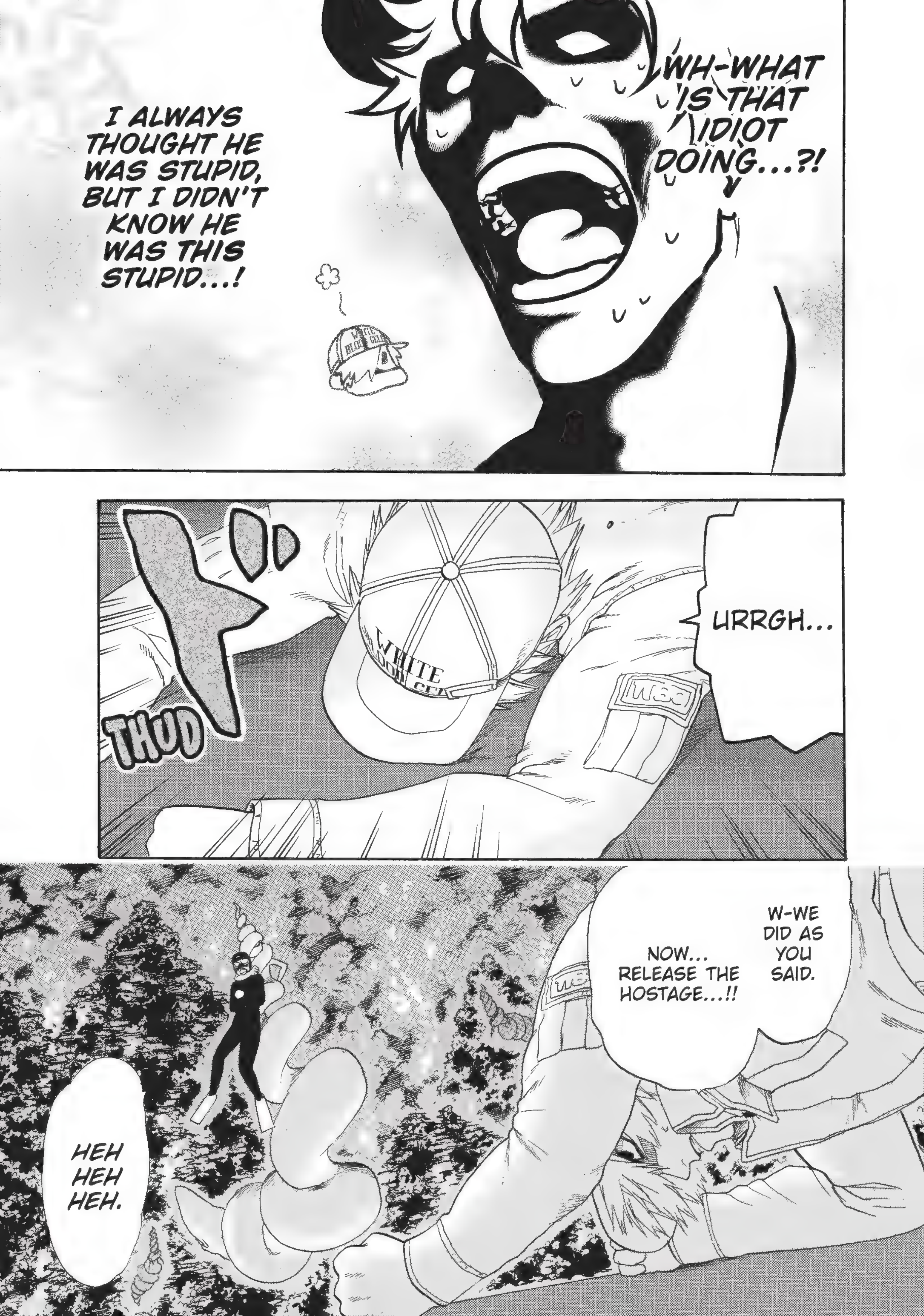
OF COURSE, YOU'LL HAVE TO DO AS WE CAMPYLOBACTERS SAY...
...IF THE LIFE OF THIS INTESTINAL EPITHELIAL CELL MEANS ANYTHING TO YOU!!!
BAM
WHA... A HOSTAGE?!
WHAT A DIRTY TRICK!!
SHOCK
TH-THEY TOOK A HOSTAGE...
WE'RE NOT ALLOWED TO MAKE A MOVE UNTIL WE RECEIVE ORDERS TO DEPLOY!
UM, SHOULDN'T WE GO, TOO?

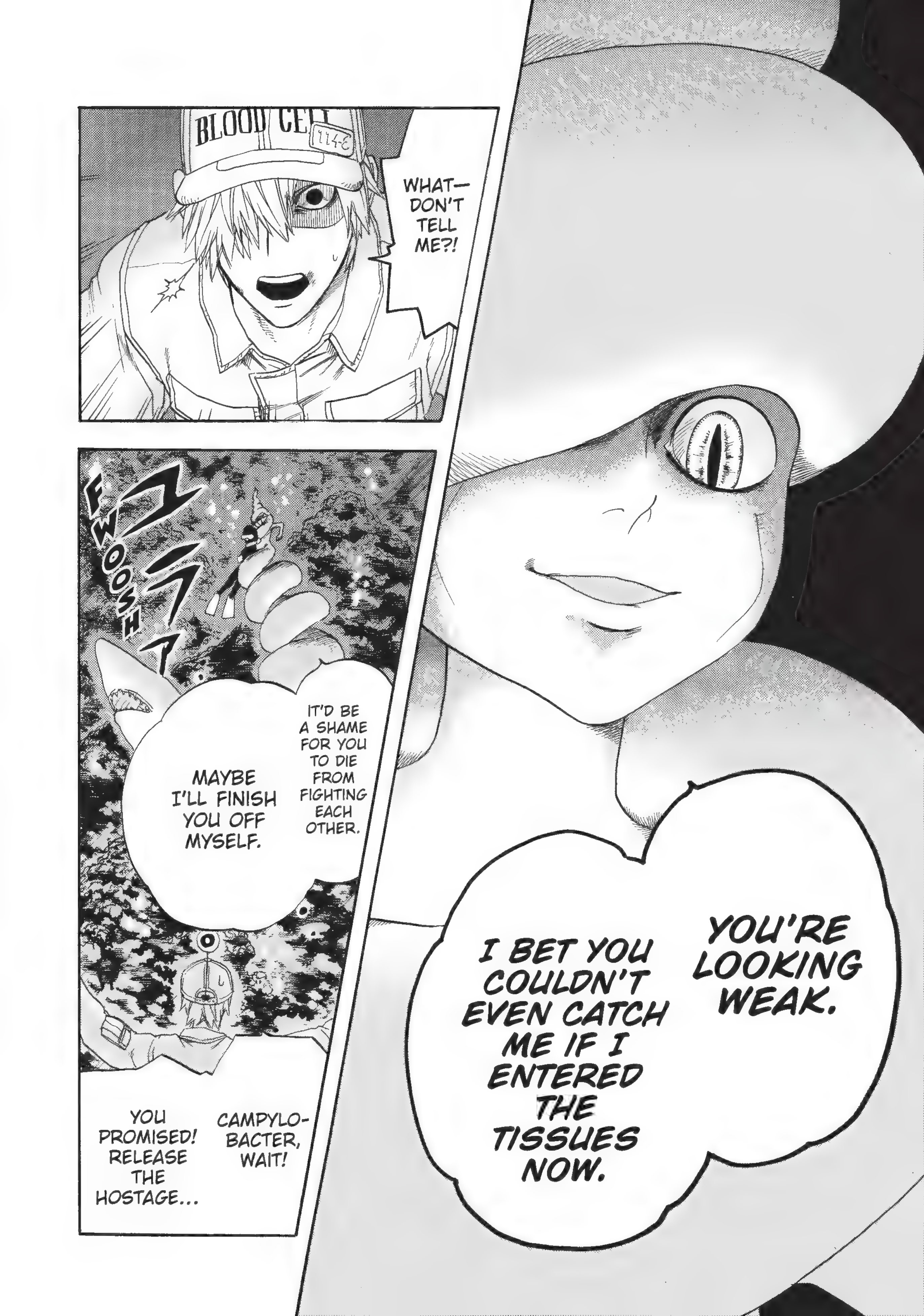

H-HELP ME!!
GLUB ゴボ
GLUB ゴボ
WE'VE BEEN STRATEGIZING, TOO...
YOU'VE KILLED SO MANY OF US, AFTER ALL. YOU WHITE BLOOD CELLS HAVE TO PROTECT THE LIVES OF NORMAL CELLS.
NOW, IF WE STAY HERE, YOUR FRIENDS MIGHT TRY A SNEAK ATTACK.
SO WE'LL RETREAT INTO THE INTESTINES FOR NOW.
BWA HA HA HA HA HA
FOLLOW US IF YOU CAN, WHITE BLOOD CELLS!
GLUB ゴボ
GLUB ボ ボ
WHAT DO WE DO?! WE CAN'T LEAVE THESE TISSUES!
CAMPYLOBACTER, WAIT! RELEASE THE HOSTAGE!!
WHAT ARE YOUR DEMANDS?!
GLUB ゴボ
GLUB ゴボ
HEH HEH.

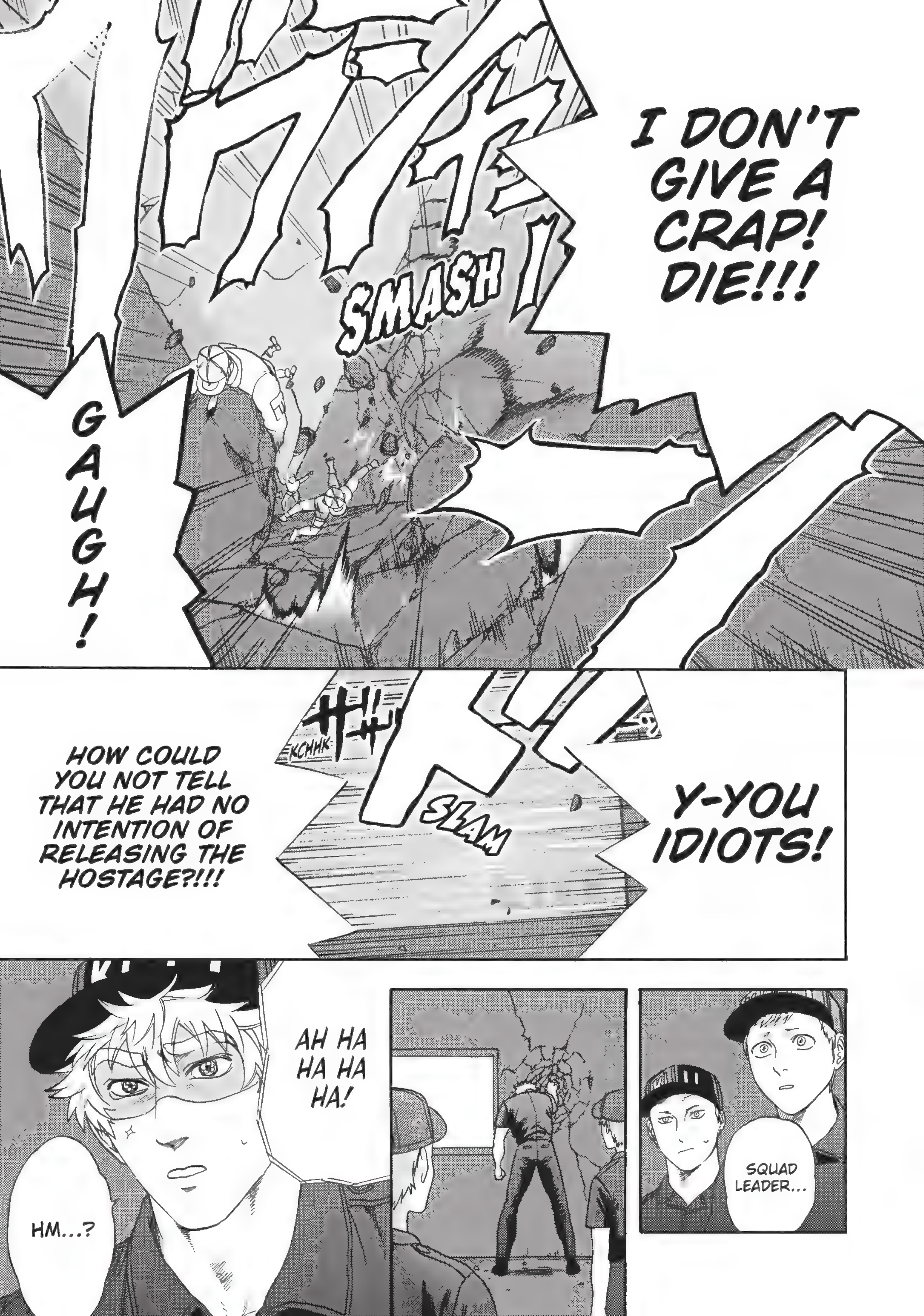

WE WANT YOU TO MAKE THESE INTESTINES...
...COMFORTABLE FOR US NAUGHTY GERMS.
YOU'LL DELIVER THE NUTRIENTS TO US FIRST, AND GET RID OF ANY BACTERIA THAT GET IN OUR WAY!
I'LL DO MY TRICK NOW!
WE'LL GET THREE MEALS A DAY, PLUS NAPS. YOU'LL LET US BUILD A COLONY ON A PEACEFUL PIECE OF PRIME REAL ESTATE WITH A VIEW!
AND YOU WHITE BLOOD CELLS WILL ENTERTAIN US EVERY DAY, PERFORMING TRICKS FOR US FROM YOUR SIDE OF THAT GLASS!
A PARADISE OF CAMPYLOBACTERS, BY CAMPYLOBACTERS, FOR CAMPYLOBACTERS!!
HEE HEE HEE HEE♡

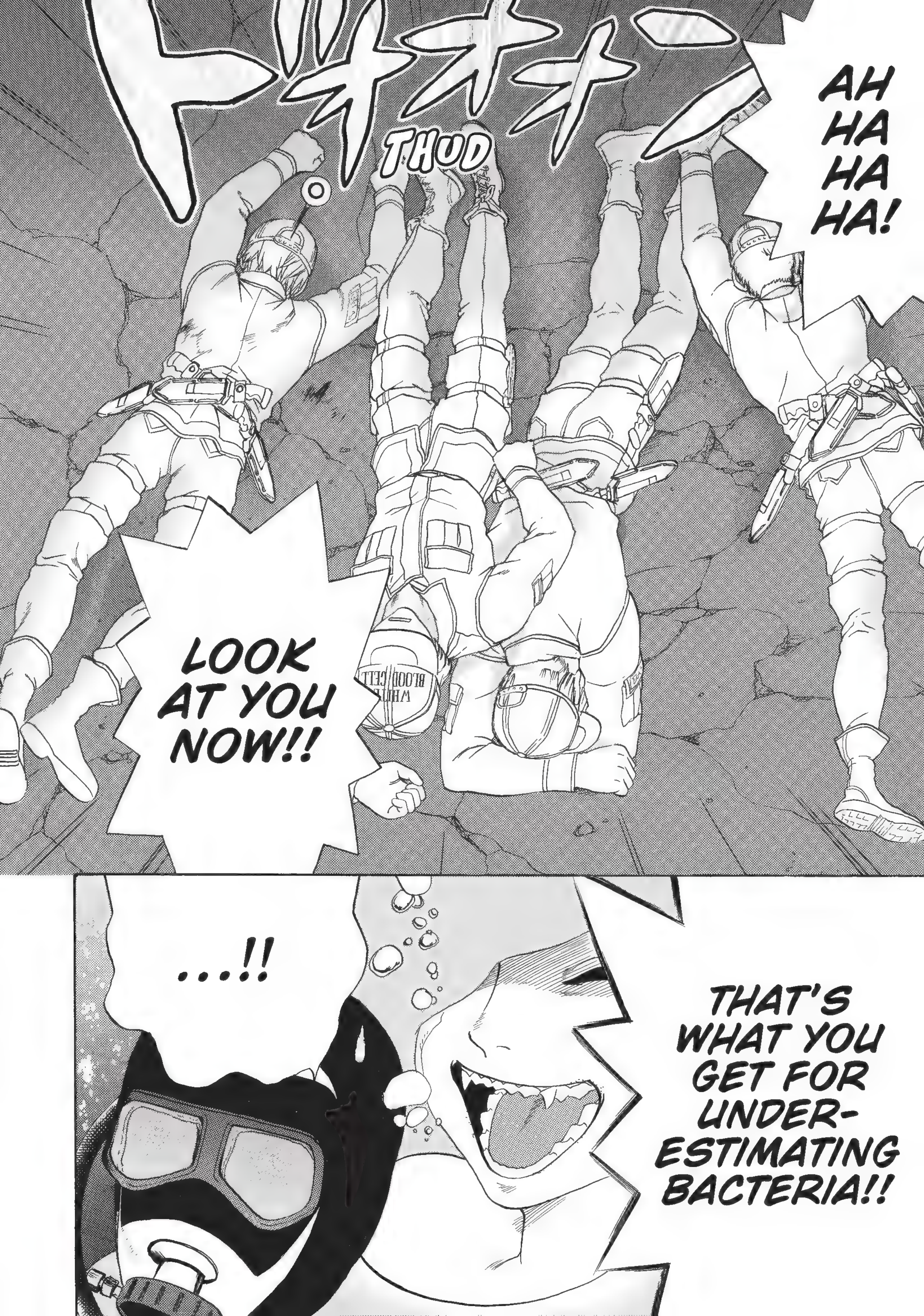

IF YOU CAN DO THAT, THEN WE'LL EXERCISE DUE MODERATION ON OUR END.
THAT'S CRAZY. IT'S NOT LIKE WE HAVE FREE TIME TO SPARE.
NO... HOLD ON, NUMBER 2626.
LET'S AGREE ...
...TO THEIR DEMANDS.
ざわっ
CLAMOR
!!
THERE YOU HAVE IT! NOW, RELEASE THE HOSTAGE...
NO, NO, HOLD UP! HUH?! WHAT?! YOU'RE GIVING IN?! OH YEAH!

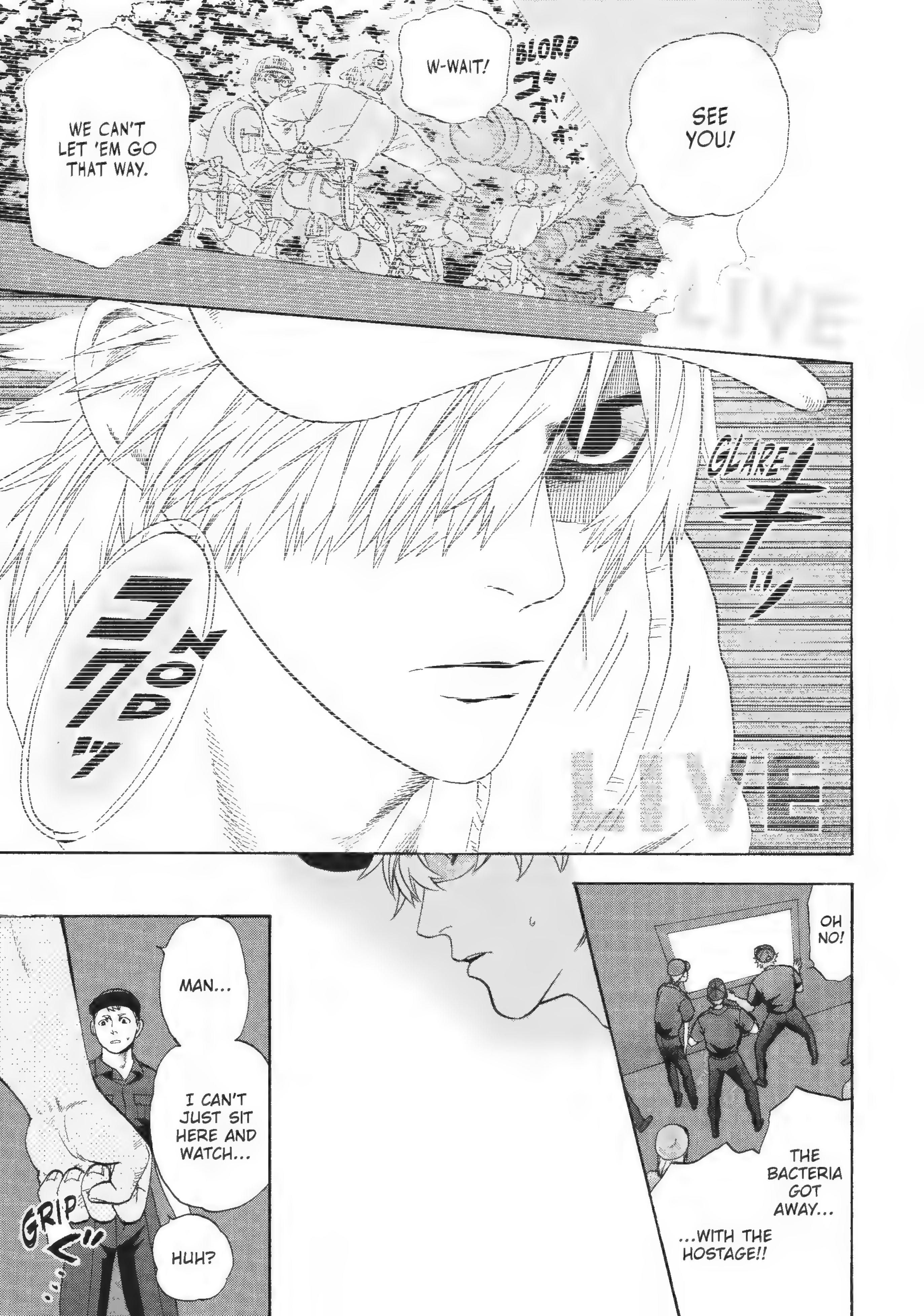

FINE! WE'LL RELEASE THE HOSTAGES.
BUT BEFORE I DO, YOU'LL DO AS I SAY!!
HANG YOUR HEADS IN PENANCE!
YOU'VE KILLED SO MANY OF US!
しゅーーん DROOOP
NOW DO A DANCE!
GUH!
WE HAVE NO CHOICE! DANCE!
やんや WHIP
やんや WHIP
WHITE BLOOD CELL
BEAT EACH OTHER UP!
うおりゃあああああ RAAAH
WHITE BLOOD CELL

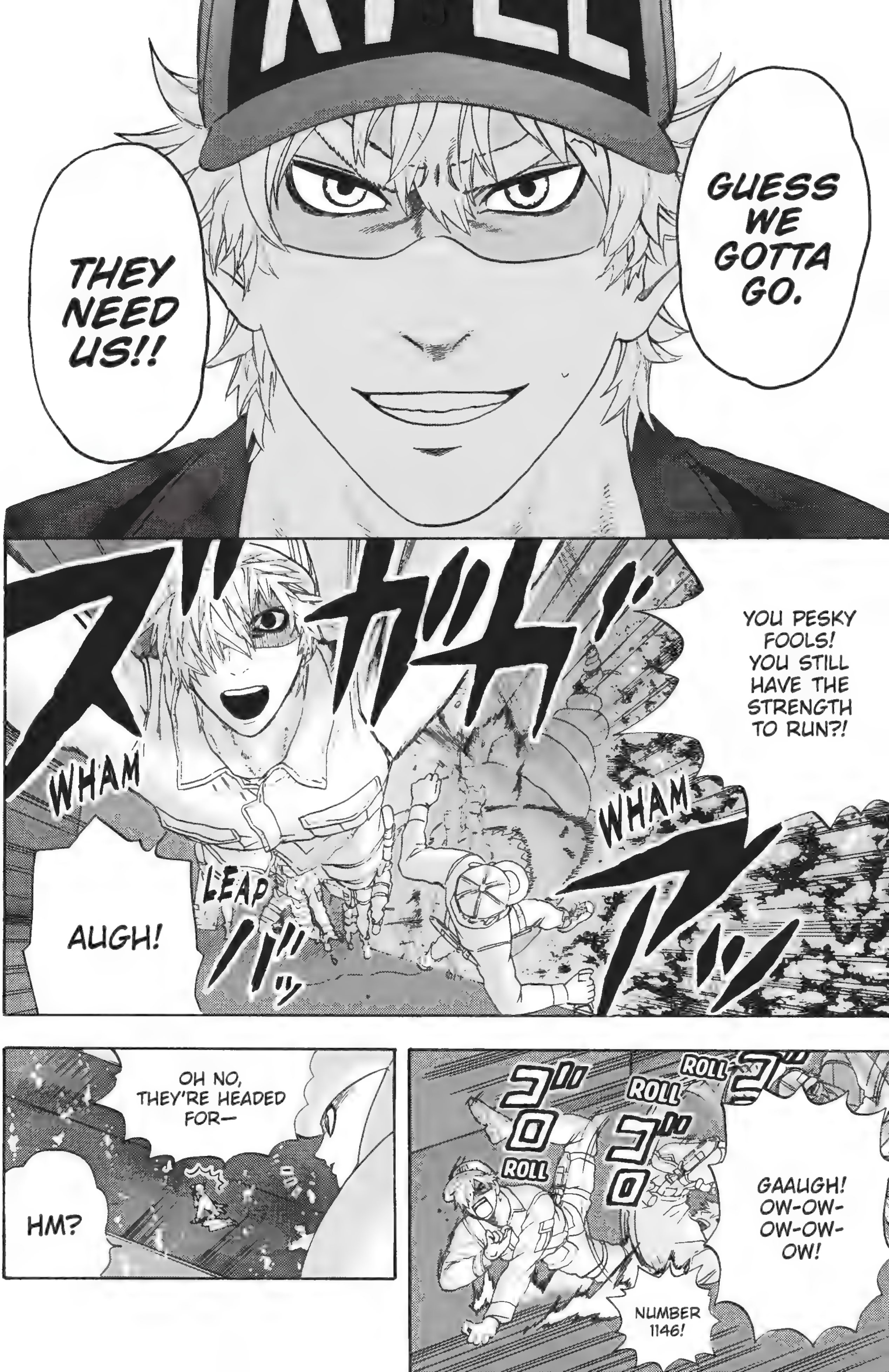

WH-WHAT IS THAT IDIOT DOING...?!
I ALWAYS THOUGHT HE WAS STUPID, BUT I DIDN'T KNOW HE WAS THIS STUPID...!
WHITE BLOOD CELL
URRGH...
WHITE BLOOD CELL
WBC
THUD
W-WE DID AS YOU SAID.
NOW... RELEASE THE HOSTAGE...!!
WBC
HEH HEH HEH.

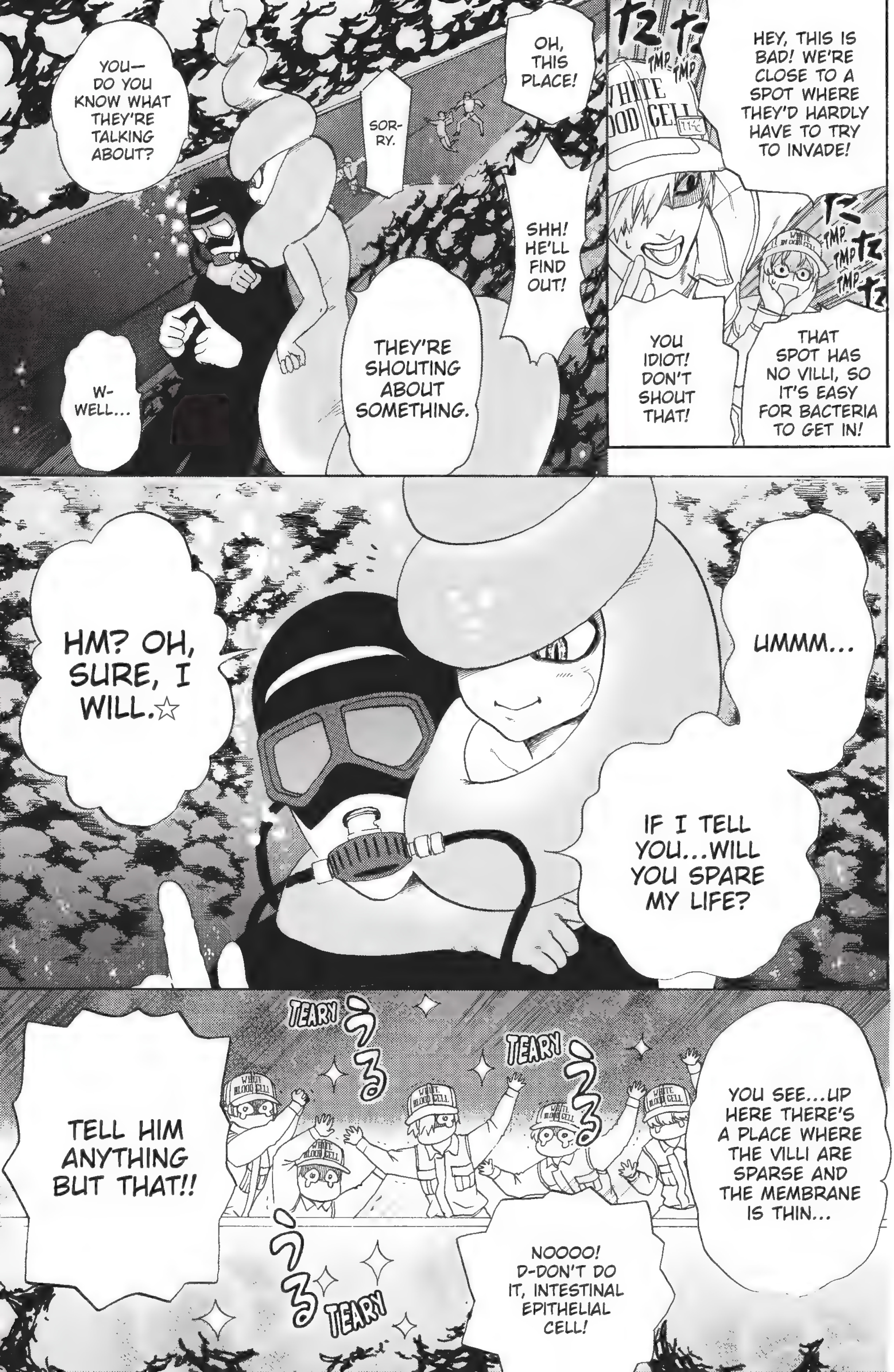

YOU'RE LOOKING WEAK.
I BET YOU COULDN'T EVEN CATCH ME IF I ENTERED THE TISSUES NOW.
BLOOD CELL
WHAT— DON'T TELL ME?!
FWOOSH
IT'D BE A SHAME FOR YOU TO DIE FROM FIGHTING EACH OTHER.
MAYBE I'LL FINISH YOU OFF MYSELF.
CAMPYLO-BACTER, WAIT!
YOU PROMISED! RELEASE THE HOSTAGE...

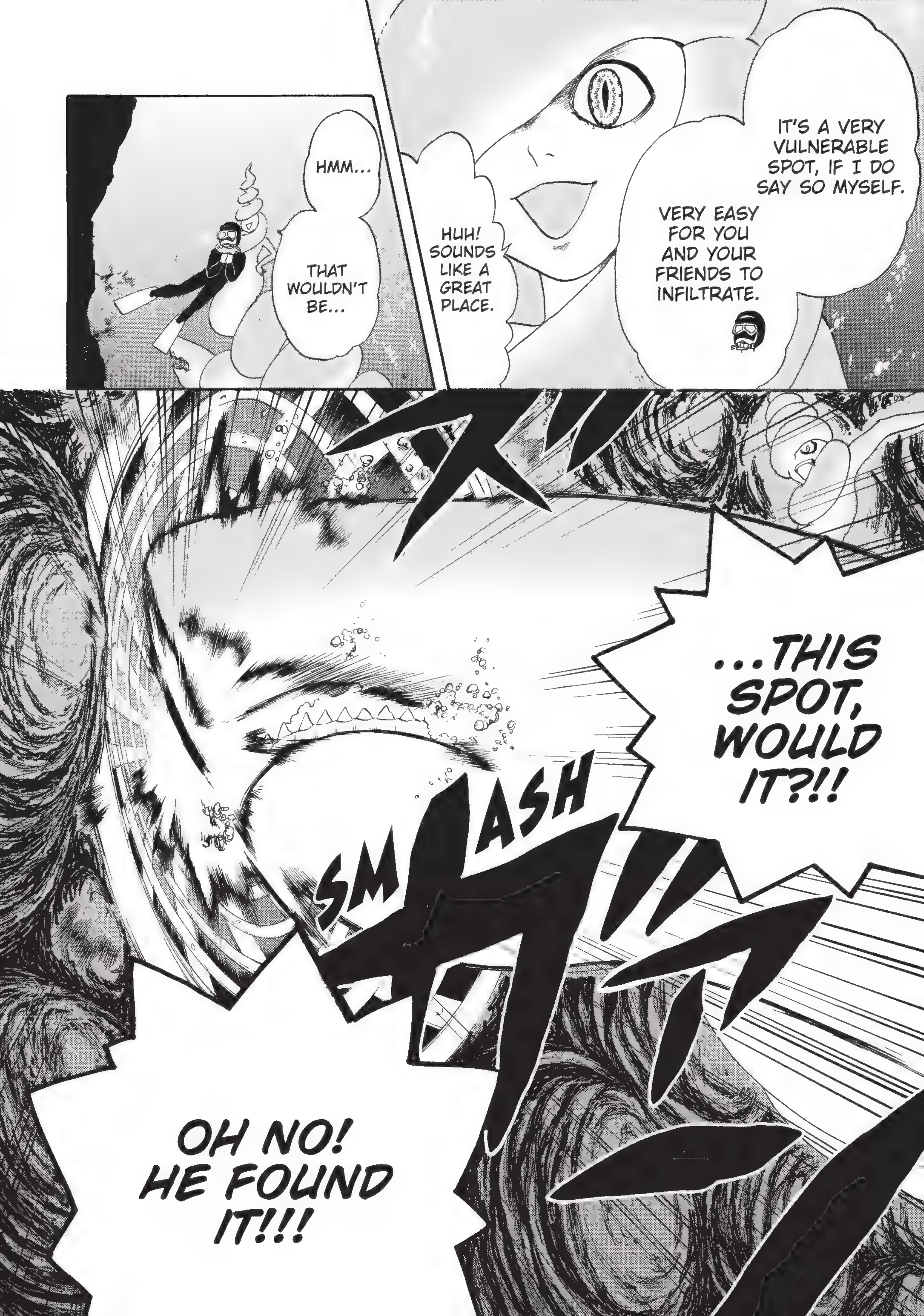

I DON'T GIVE A CRAP! DIE!!!
SMASH
GAUGH!
Y-YOU IDIOTS!
HOW COULD YOU NOT TELL THAT HE HAD NO INTENTION OF RELEASING THE HOSTAGE?!!!
SLAM
KCHHK
SQUAD LEADER...
AH HA HA HA HA!
HM...?

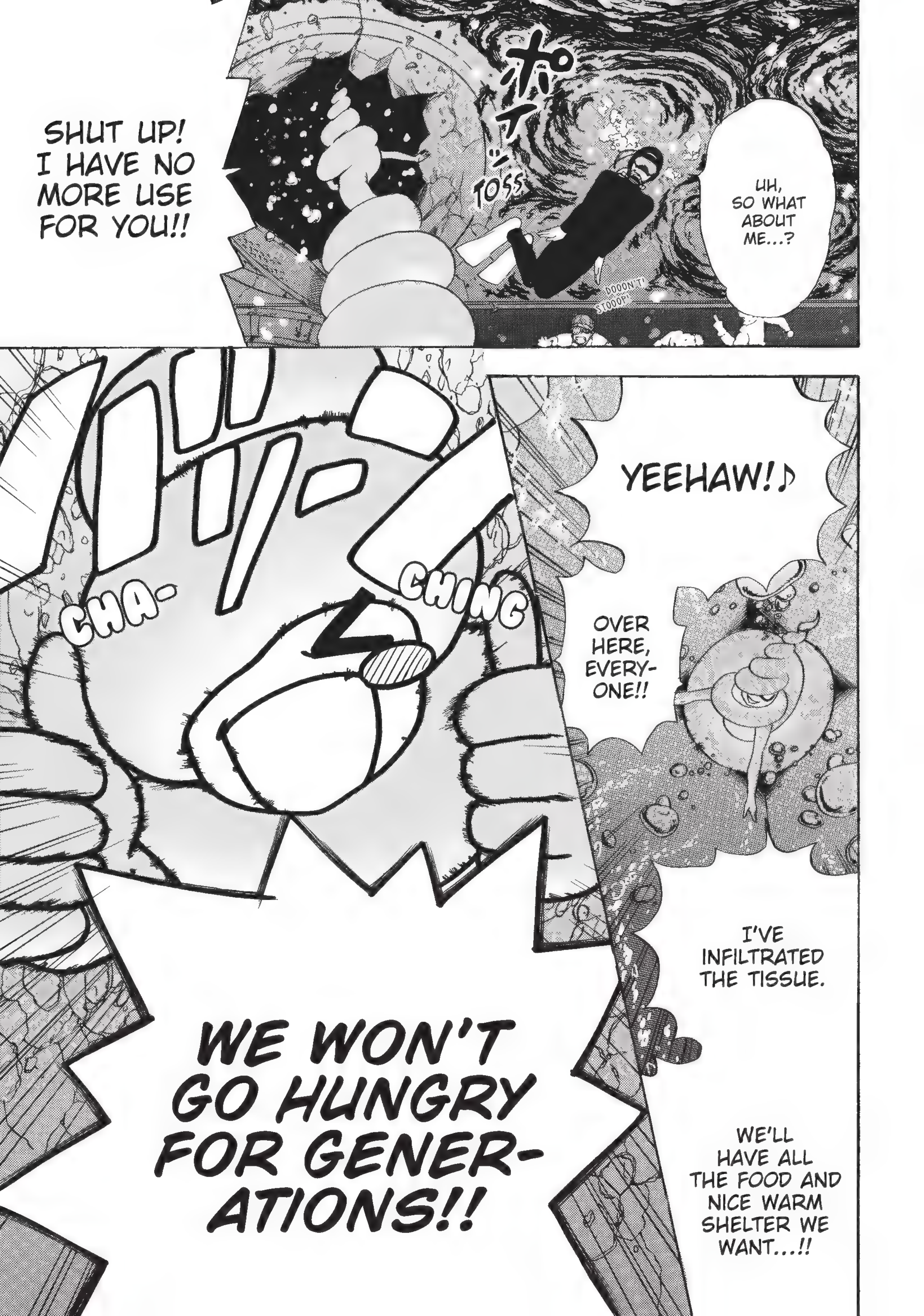

AH HA HA HA!
THUD
LOOK AT YOU NOW!!
WHITE BLOOD CELL
THAT'S WHAT YOU GET FOR UNDERESTIMATING BACTERIA!!
...!!

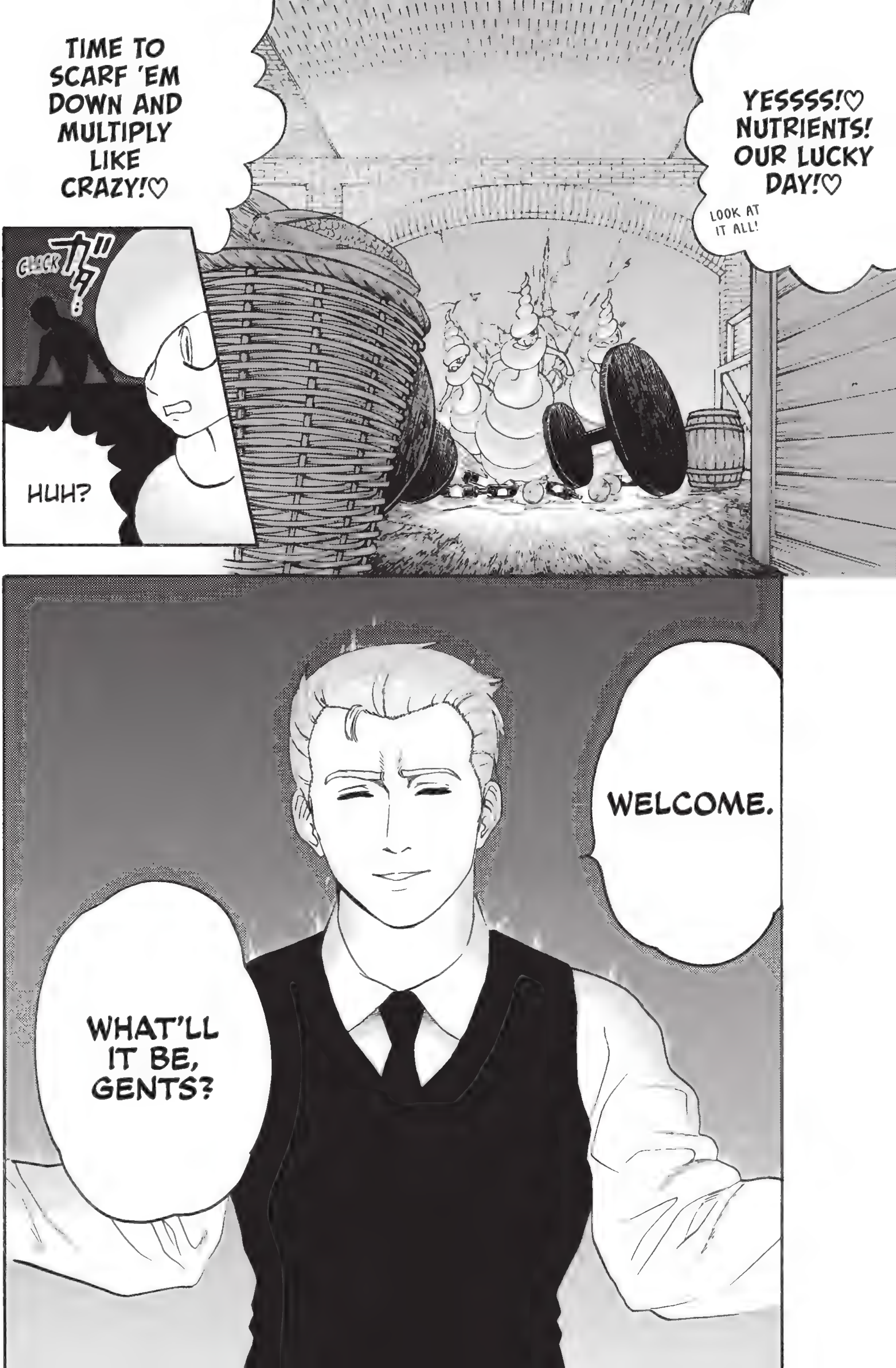

SEE YOU!
BLORP ゴボボ
W-WAIT!
WE CAN'T LET 'EM GO THAT WAY.
LIVE
GLARE キッ
NOD コクッ
LIVE
OH NO!
THE BACTERIA GOT AWAY...
...WITH THE HOSTAGE!!
MAN...
I CAN'T JUST SIT HERE AND WATCH...
HUH?
GRIP ぐッ

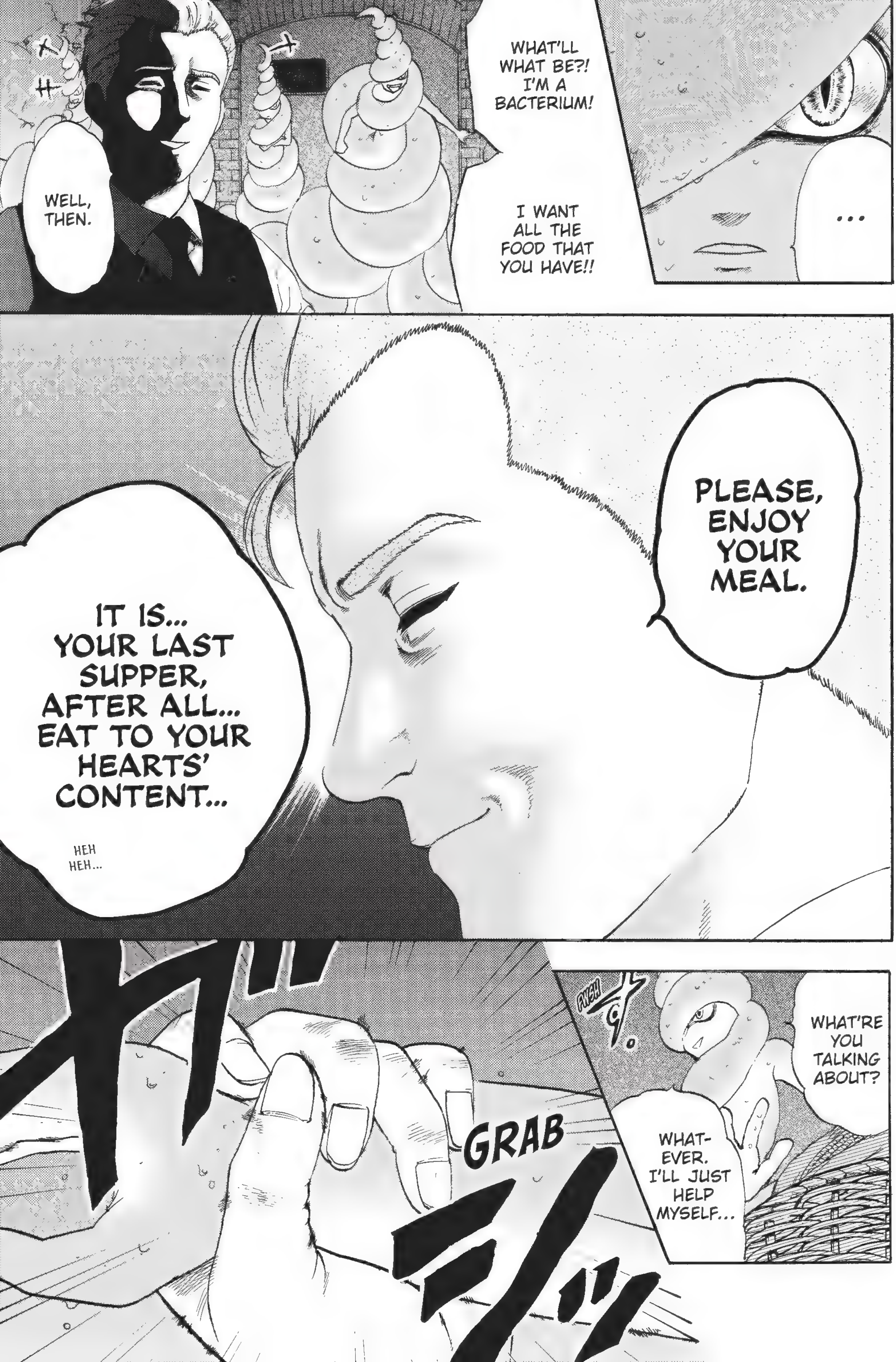

GUESS WE GOTTA GO.
THEY NEED US!!
YOU PESKY FOOLS! YOU STILL HAVE THE STRENGTH TO RUN?!
ズガッ
WHAM
ガッ
WHAM
LEAP
バッ
AUGH!
ゴロ
ROLL
ROLL
ROLL
ゴロ
GAAUGH! OW-OW-OW-OW-OW!
NUMBER 1146!
OH NO, THEY'RE HEADED FOR—
HM?

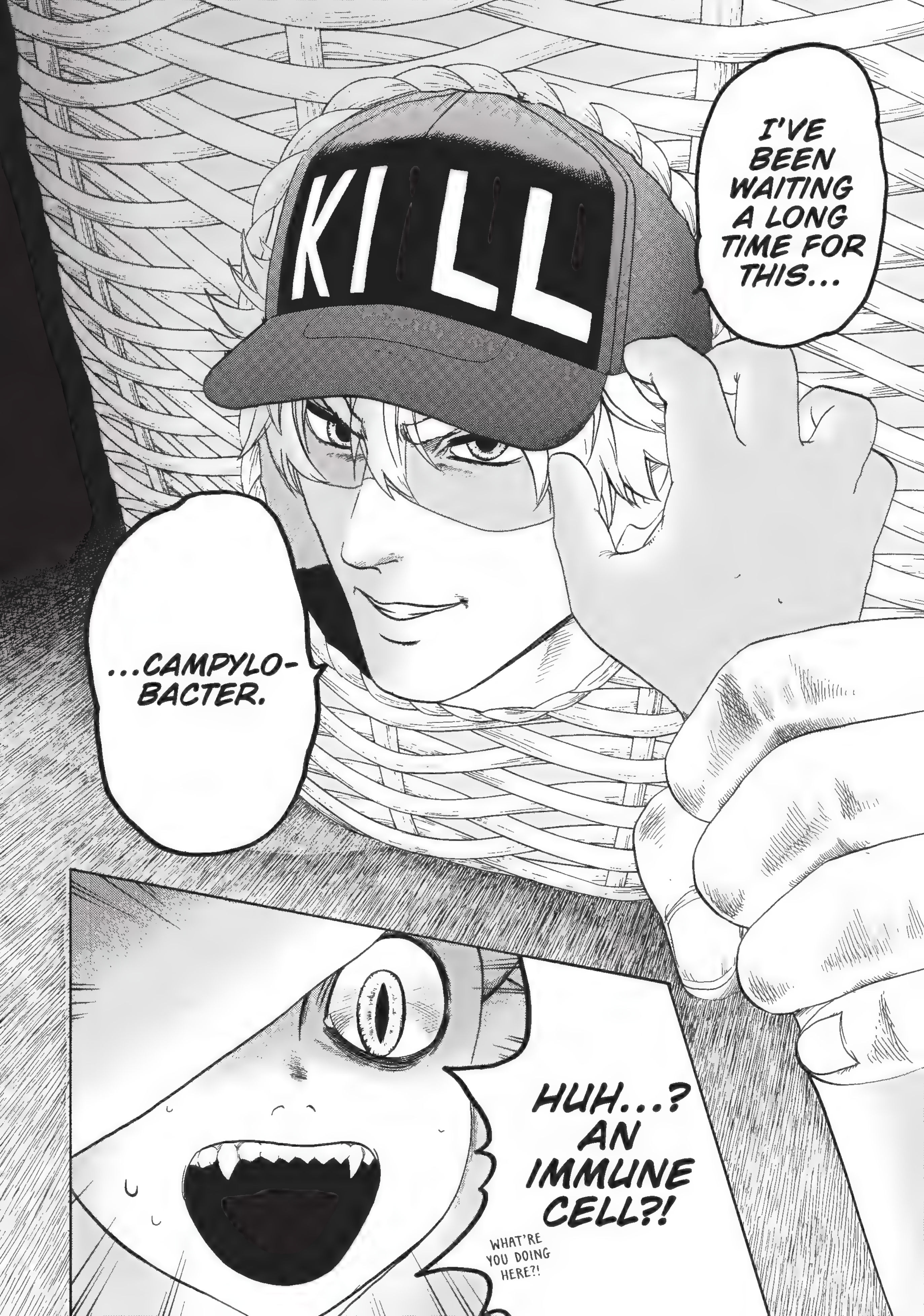

HEY, THIS IS BAD! WE'RE CLOSE TO A SPOT WHERE THEY'D HARDLY HAVE TO TRY TO INVADE!
TMP TMP
WHITE BLOOD CELL
TMP TMP TMP
THAT SPOT HAS NO VILLI, SO IT'S EASY FOR BACTERIA TO GET IN!
YOU IDIOT! DON'T SHOUT THAT!
OH, THIS PLACE!
SHH! HE'LL FIND OUT!
SOR-RY.
THEY'RE SHOUTING ABOUT SOMETHING.
YOU—DO YOU KNOW WHAT THEY'RE TALKING ABOUT?
W-WELL...
UMMM...
IF I TELL YOU...WILL YOU SPARE MY LIFE?
HM? OH, SURE, I WILL.☆
YOU SEE...UP HERE THERE'S A PLACE WHERE THE VILLI ARE SPARSE AND THE MEMBRANE IS THIN...
TEARY
TEARY
NOOOO! D-DON'T DO IT, INTESTINAL EPITHELIAL CELL!
TEARY
TELL HIM ANYTHING BUT THAT!!

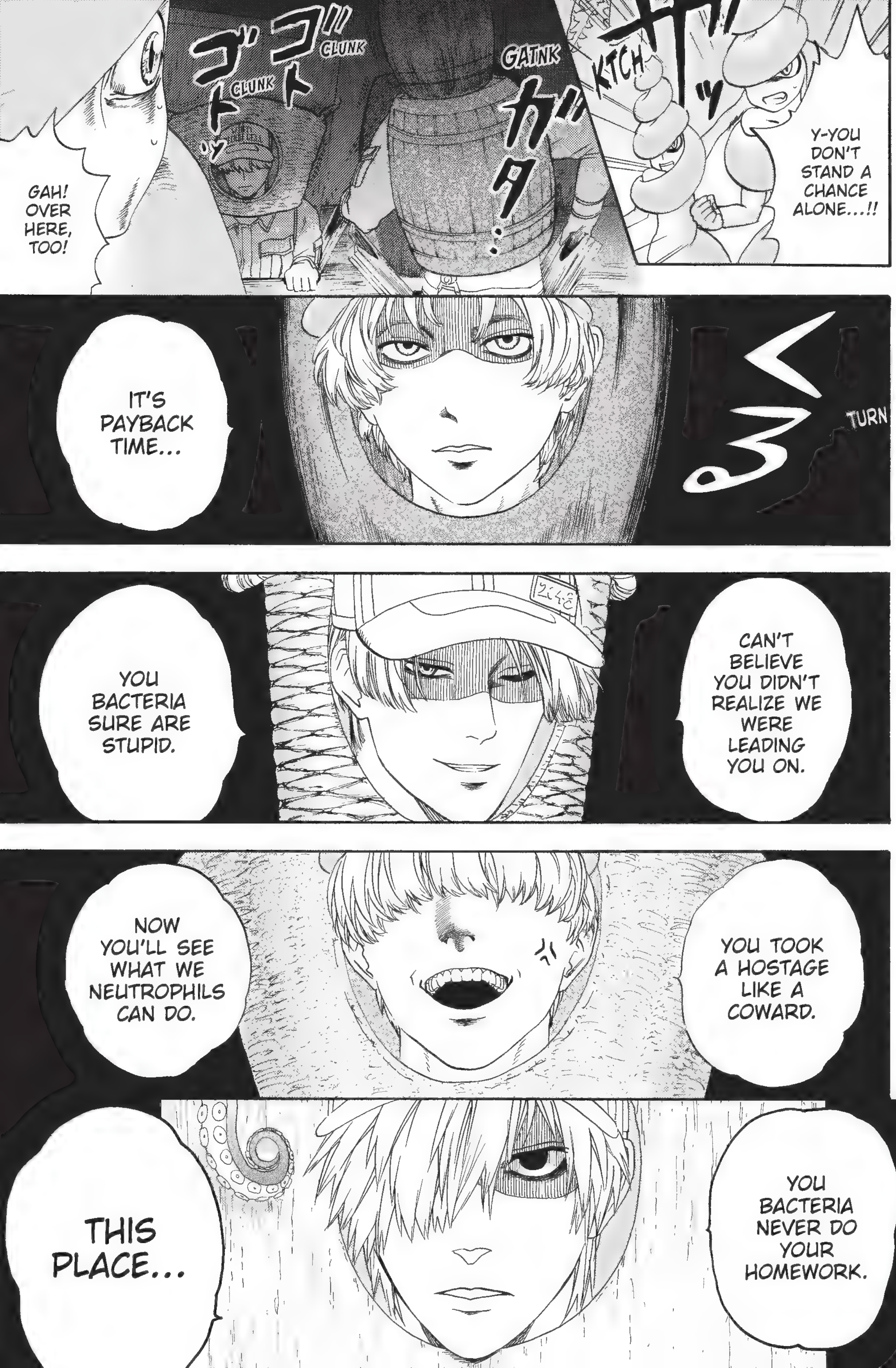

IT'S A VERY VULNERABLE SPOT, IF I DO SAY SO MYSELF.
VERY EASY FOR YOU AND YOUR FRIENDS TO INFILTRATE.
HUH! SOUNDS LIKE A GREAT PLACE.
HMM...
THAT WOULDN'T BE...
...THIS SPOT, WOULD IT?!!
SMASH
OH NO! HE FOUND IT!!!

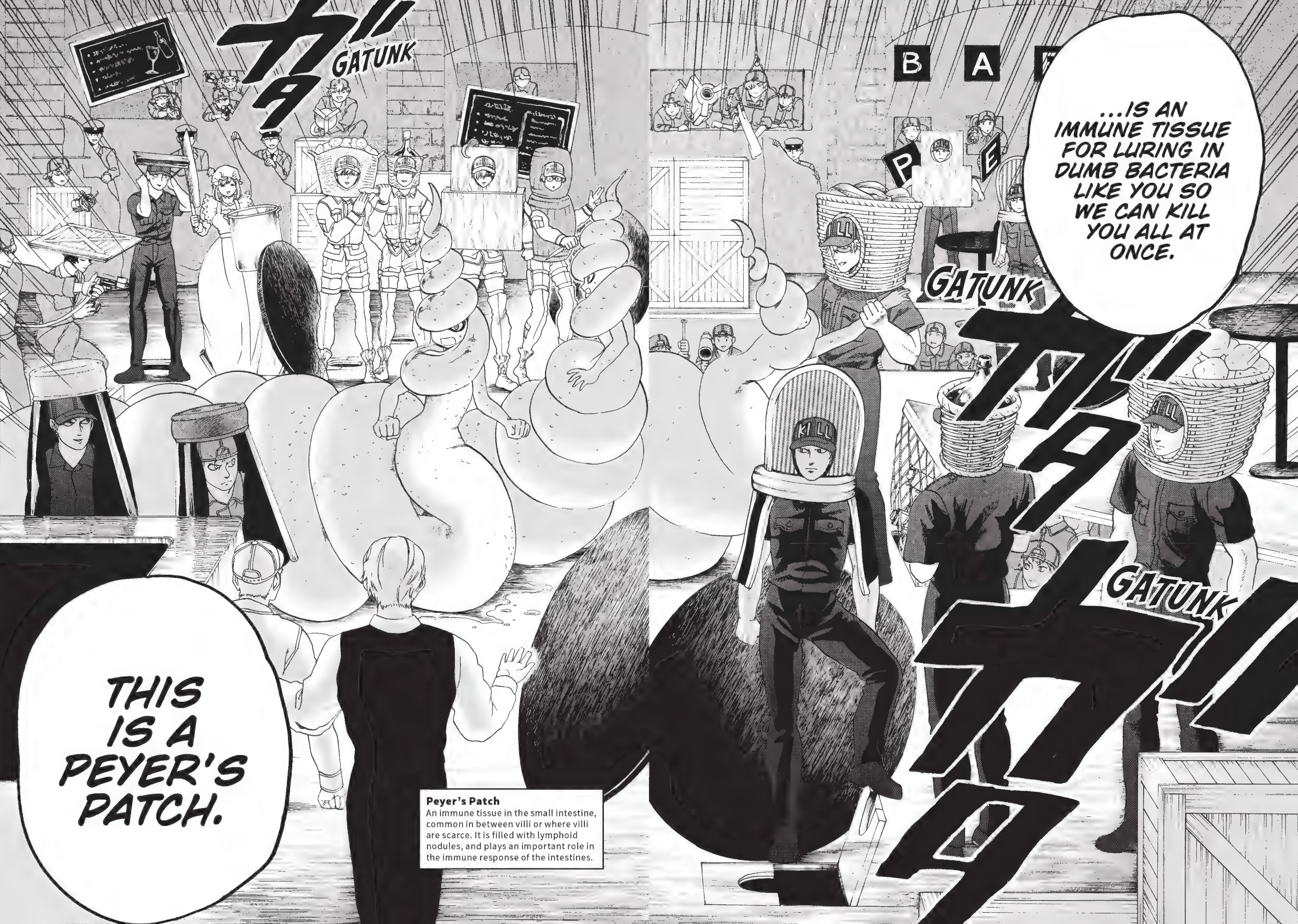

UH, SO WHAT ABOUT ME...?
ポイッ
TOSS
DOOON'T! STOOOP!
SHUT UP! I HAVE NO MORE USE FOR YOU!!
YEEHAW!♪
OVER HERE, EVERYONE!!
I'VE INFILTRATED THE TISSUE.
WE'LL HAVE ALL THE FOOD AND NICE WARM SHELTER WE WANT...!!
CHA-CHING
WE WON'T GO HUNGRY FOR GENERATIONS!!


YESSSS!♡ NUTRIENTS! OUR LUCKY DAY!♡
LOOK AT IT ALL!
TIME TO SCARF 'EM DOWN AND MULTIPLY LIKE CRAZY!♡
GLICK ガタ!
HUH?
WELCOME.
WHAT'LL IT BE, GENTS?

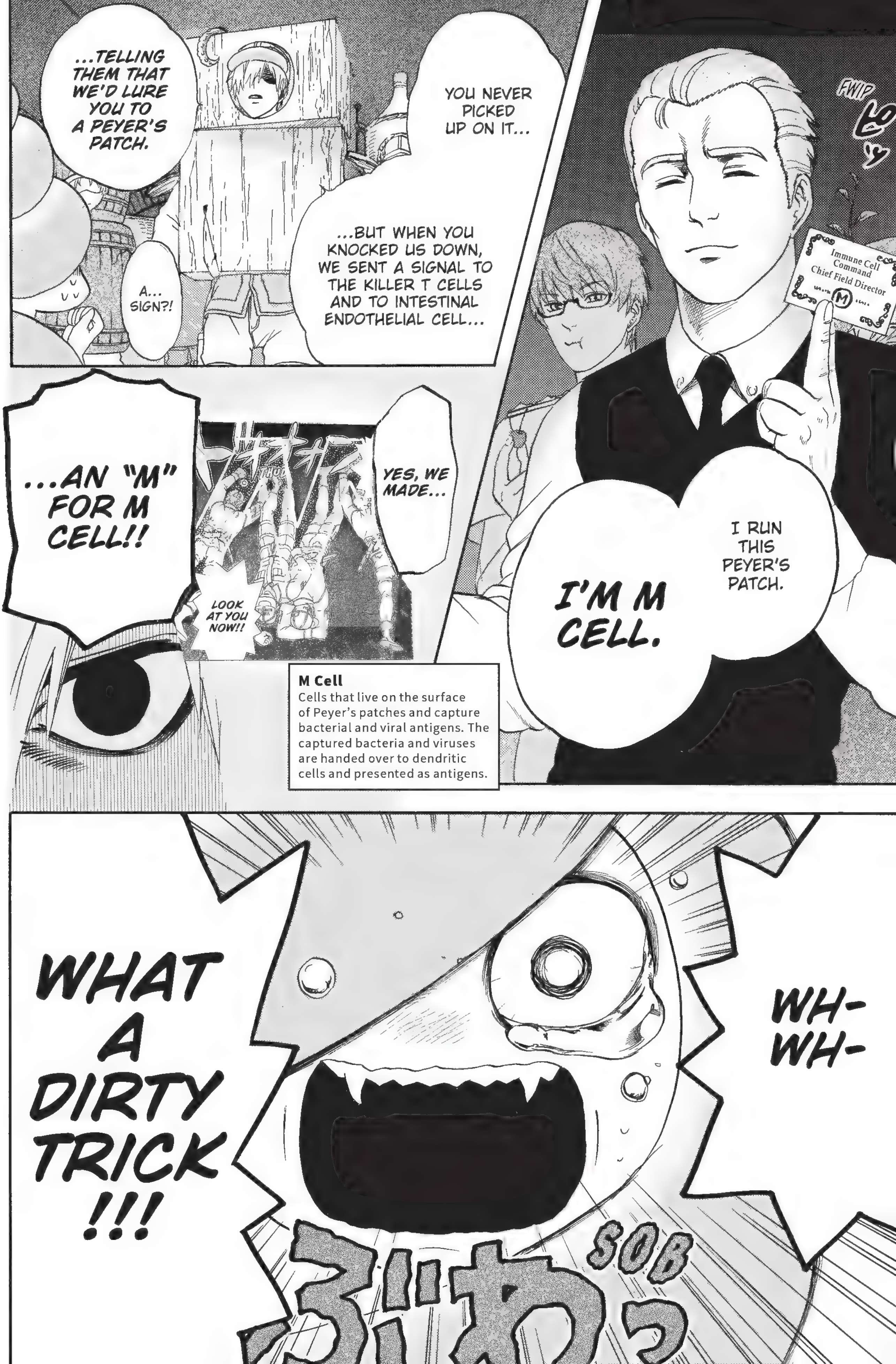

...
WHAT'LL WHAT BE?! I'M A BACTERIUM!
I WANT ALL THE FOOD THAT YOU HAVE!!
WELL, THEN.
PLEASE, ENJOY YOUR MEAL.
IT IS... YOUR LAST SUPPER, AFTER ALL... EAT TO YOUR HEARTS' CONTENT...
HEH HEH...
FWSH
WHAT'RE YOU TALKING ABOUT?
WHAT-EVER. I'LL JUST HELP MYSELF...
GRAB


KILL
I'VE BEEN WAITING A LONG TIME FOR THIS...
...CAMPYLOBACTER.
HUH...? AN IMMUNE CELL?!
WHAT'RE YOU DOING HERE?!

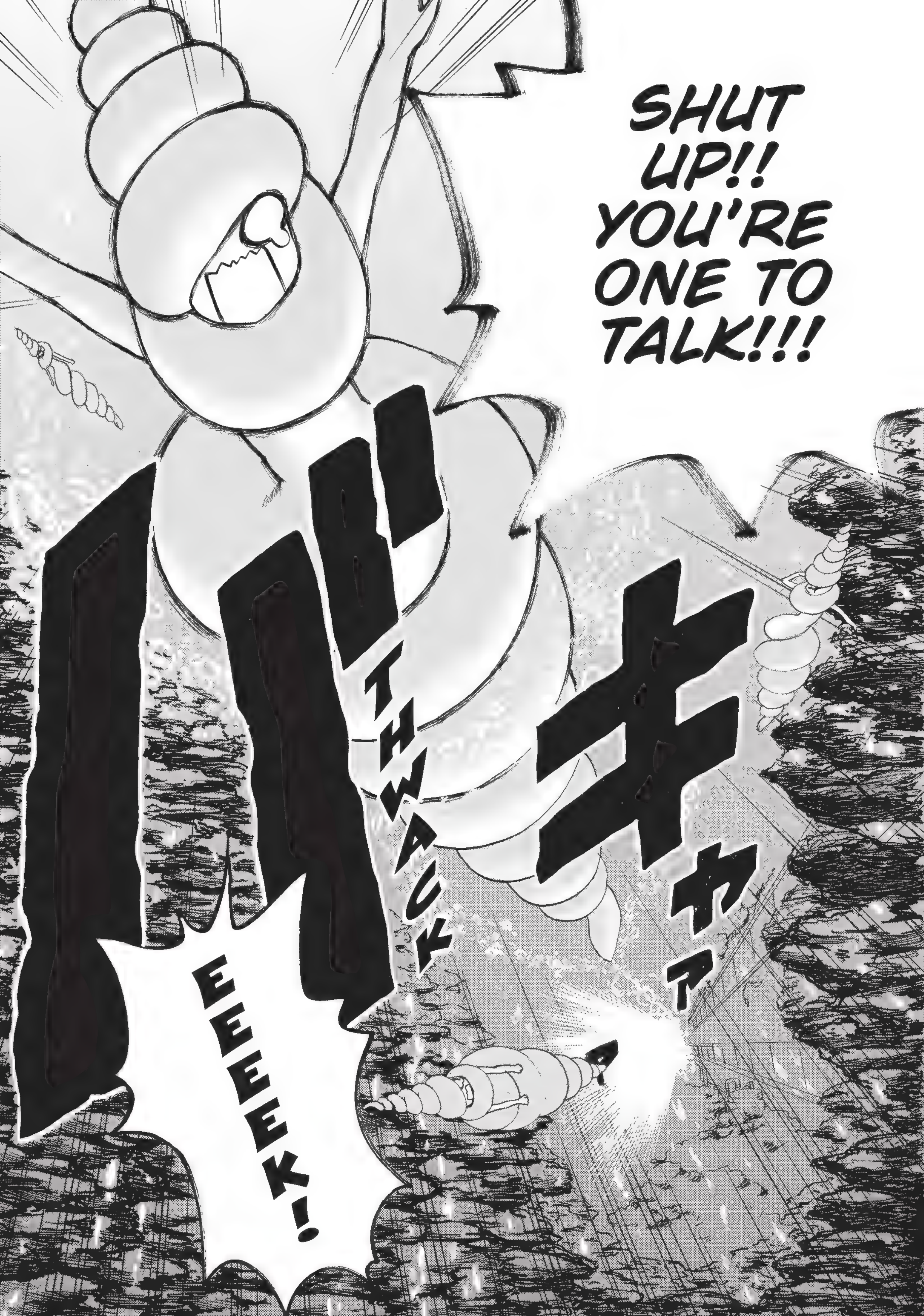

ガッ
KTCH
Y-YOU DON'T STAND A CHANCE ALONE...!!
ガタ
GATINK
ゴト
CLUNK
ゴト
CLUNK
GAH! OVER HERE, TOO!
くる
TURN
IT'S PAYBACK TIME...
CAN'T BELIEVE YOU DIDN'T REALIZE WE WERE LEADING YOU ON.
YOU BACTERIA SURE ARE STUPID.
YOU TOOK A HOSTAGE LIKE A COWARD.
NOW YOU'LL SEE WHAT WE NEUTROPHILS CAN DO.
YOU BACTERIA NEVER DO YOUR HOMEWORK.
THIS PLACE...

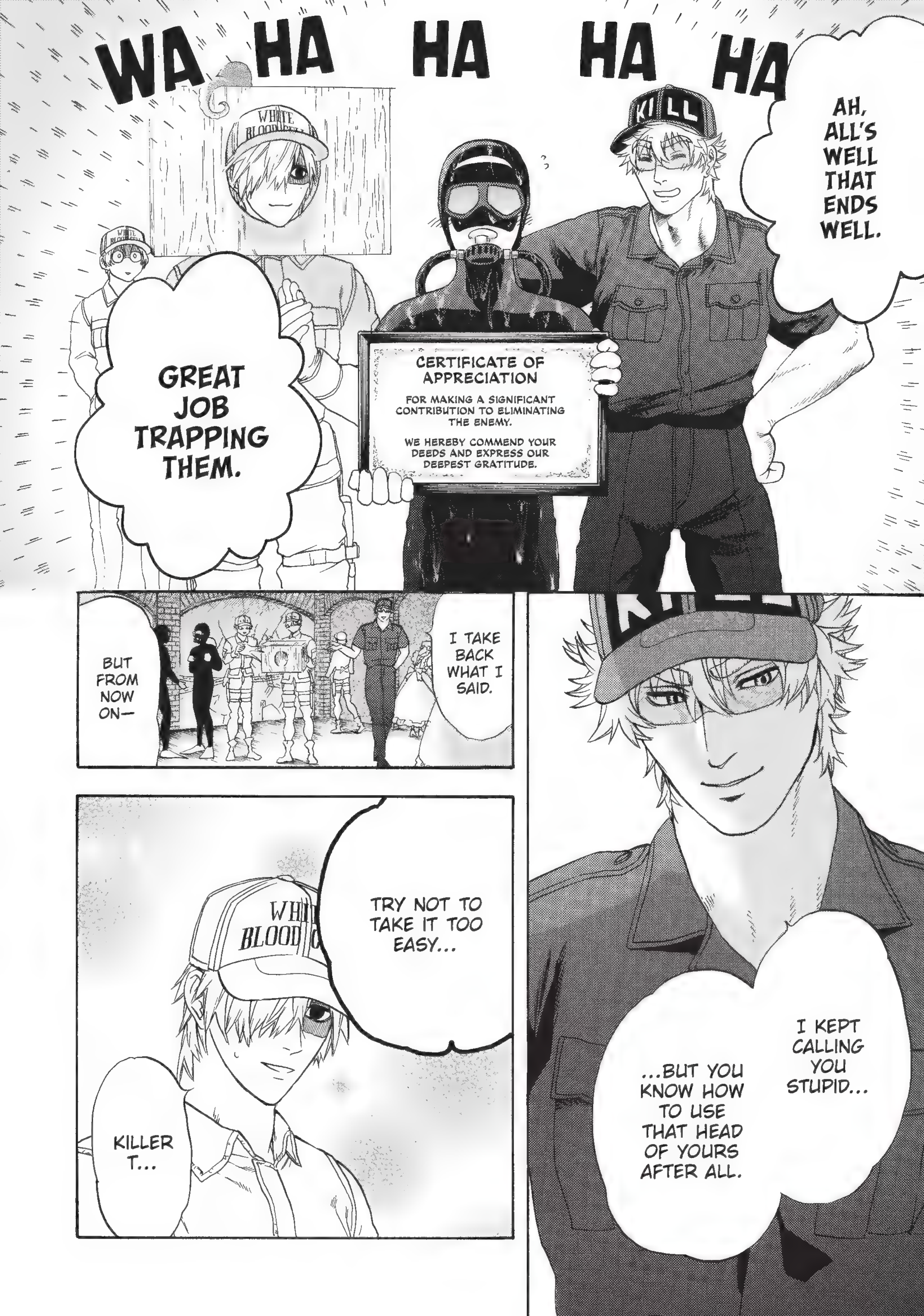

B A
P E
...IS AN IMMUNE TISSUE FOR LURING IN DUMB BACTERIA LIKE YOU SO WE CAN KILL YOU ALL AT ONCE.
GATUNK
ガタ
GATUNK
ガタ
ガタ
KILL
GATUNK
ガタ
THIS IS A PEYER'S PATCH.

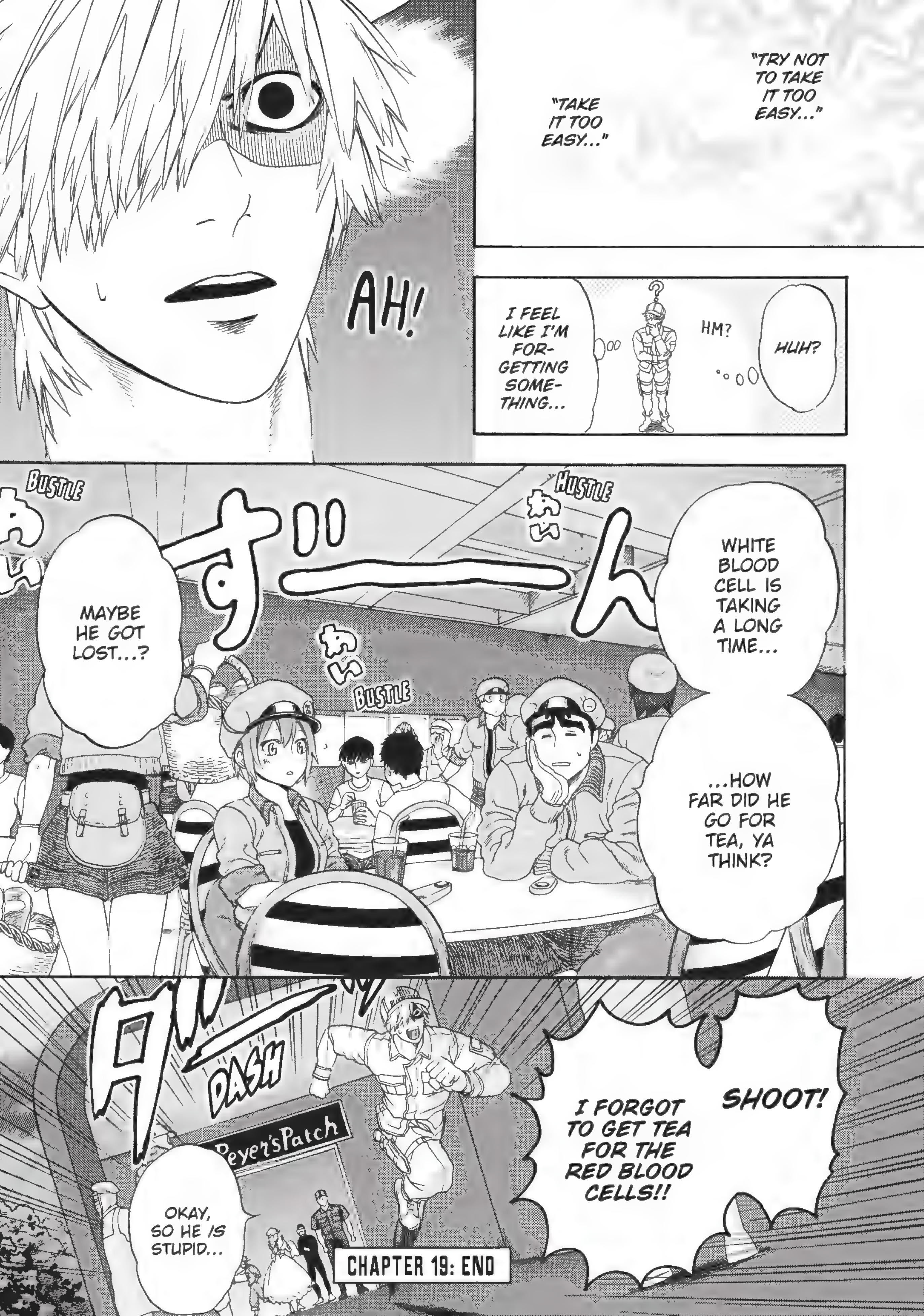
**Peyer's Patch**
An immune tissue in the small intestine, common in between villi or where villi are scarce. It is filled with lymphoid nodules, and plays an important role in the immune response of the intestines.

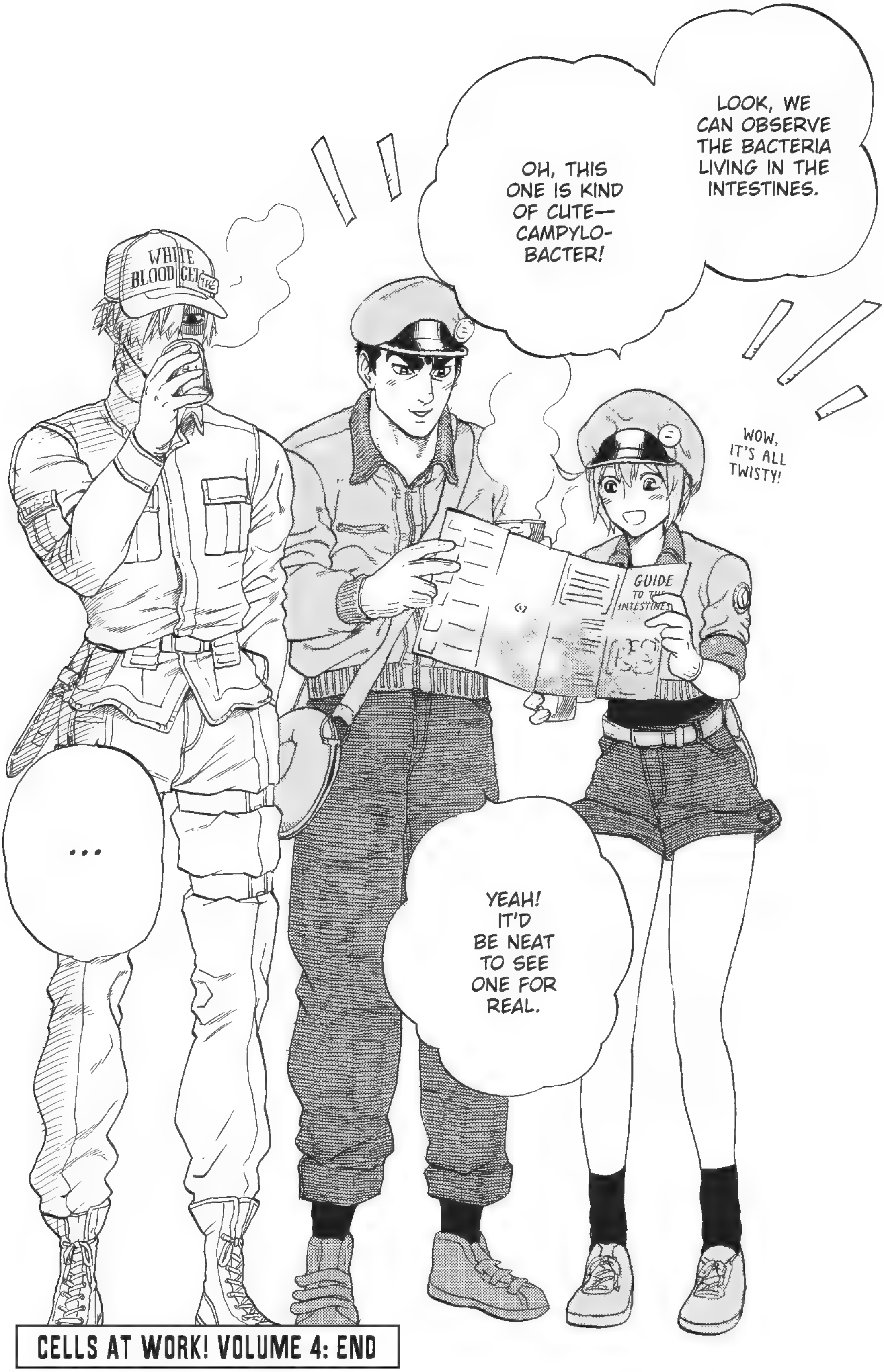

YOU NEVER PICKED UP ON IT...
...BUT WHEN YOU KNOCKED US DOWN, WE SENT A SIGNAL TO THE KILLER T CELLS AND TO INTESTINAL ENDOTHELIAL CELL...
...TELLING THEM THAT WE'D LURE YOU TO A PEYER'S PATCH.
A... SIGN?!
FWIP
Immune Cell Command Chief Field Director M
YES, WE MADE...
...AN "M" FOR M CELL!!
THUD
LOOK AT YOU NOW!!
I RUN THIS PEYER'S PATCH.
I'M M CELL.
WH-WH-
WHAT A DIRTY TRICK!!!
SOB

**M Cell**
Cells that live on the surface of Peyer's patches and capture bacterial and viral antigens. The captured bacteria and viruses are handed over to dendritic cells and presented as antigens.


SHUT UP!! YOU'RE ONE TO TALK!!!
キャァ
THWACK
EEEEK!


WA HA HA HA HA
KILL
AH, ALL'S WELL THAT ENDS WELL.
CERTIFICATE OF APPRECIATION
FOR MAKING A SIGNIFICANT CONTRIBUTION TO ELIMINATING THE ENEMY.
WE HEREBY COMMEND YOUR DEEDS AND EXPRESS OUR DEEPEST GRATITUDE.
WHITE BLOOD CELL
GREAT JOB TRAPPING THEM.
I KEPT CALLING YOU STUPID...
...BUT YOU KNOW HOW TO USE THAT HEAD OF YOURS AFTER ALL.
I TAKE BACK WHAT I SAID.
BUT FROM NOW ON—
TRY NOT TO TAKE IT TOO EASY...
KILLER T...

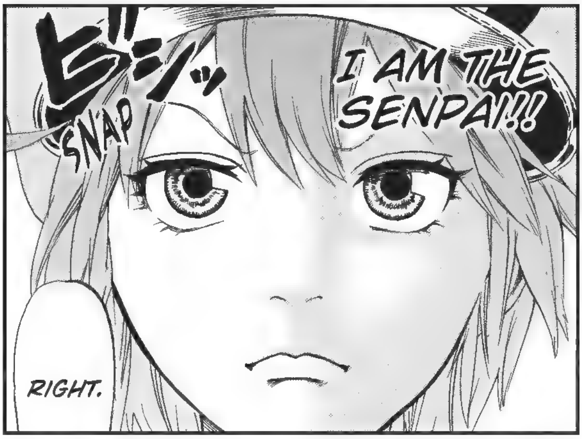

"TRY NOT TO TAKE IT TOO EASY..."
"TAKE IT TOO EASY..."
HUH?
HM?
I FEEL LIKE I'M FORGETTING SOMETHING...
AH!
HUSTLE
わい
わい
ずーん
BUSTLE
わい
BUSTLE
WHITE BLOOD CELL IS TAKING A LONG TIME...
...HOW FAR DID HE GO FOR TEA, YA THINK?
MAYBE HE GOT LOST...?
SHOOT!
I FORGOT TO GET TEA FOR THE RED BLOOD CELLS!!
ダッ
DASH
Peyer's Patch
OKAY, SO HE IS STUPID...
CHAPTER 19: END

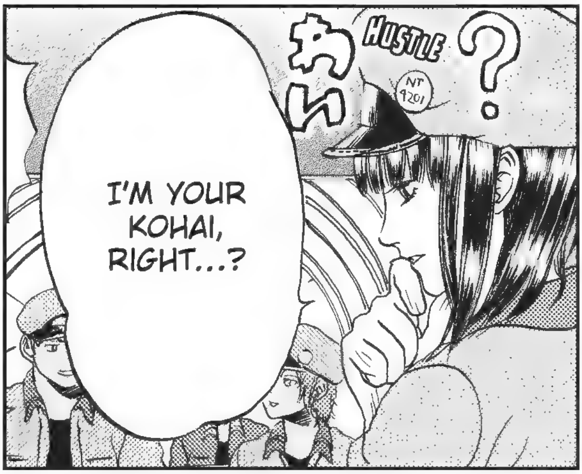

LOOK, WE CAN OBSERVE THE BACTERIA LIVING IN THE INTESTINES.
OH, THIS ONE IS KIND OF CUTE—CAMPYLOBACTER!
WOW, IT'S ALL TWISTY!
WHITE BLOOD CEL
1146
GUIDE TO THE INTESTINES
YEAH! IT'D BE NEAT TO SEE ONE FOR REAL.
...

**CELLS AT WORK! VOLUME 4: END**

Medical Editor: Tomoyuki Harada

# TRANSLATION NOTES





## Senpai and Kohai

*Page 68*

The Japanese word "*senpai*" roughly translates to "upperclassman" or "senior." While it is used by students to refer to their older peers, it is not necessarily an academic term, and can be used to refer to anyone in a given situation who's more experienced than the speaker but not necessarily in a position of authority over them, as opposed to a teacher or a boss, who would not be considered a *senpai*.

"*Kohai*," meanwhile, refers the the opposite—someone who is junior or less experienced. An underclassman at a school would be an upperclassman's *kohai*, and a newly hired employee would likewise be their more experienced colleagues' *kohai*.

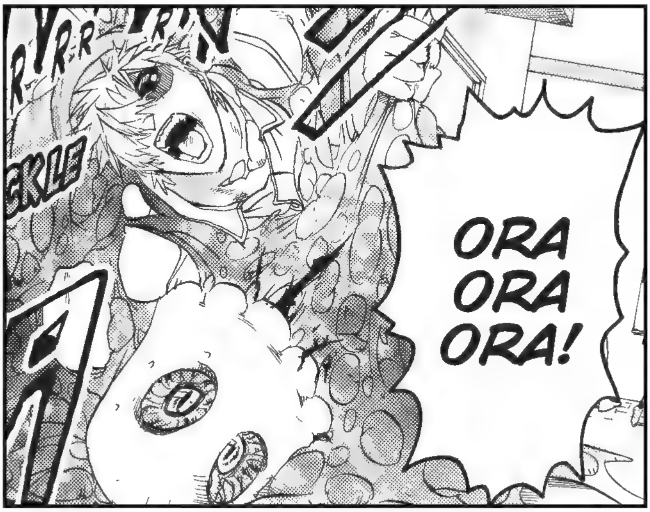
*Senpai* are generally obliged to look out for their *kohai*, while *kohai* are expected to respect their *senpai*.

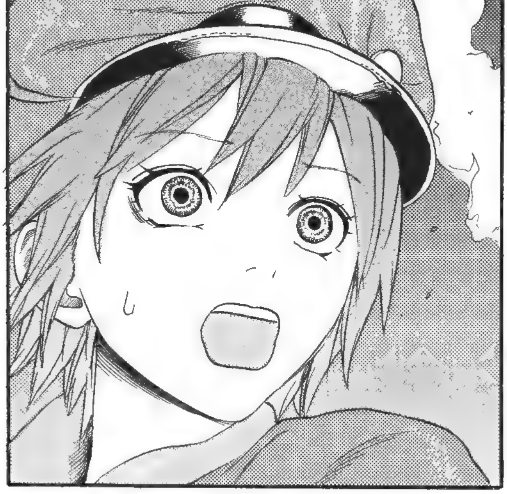
## Ora ora ora!

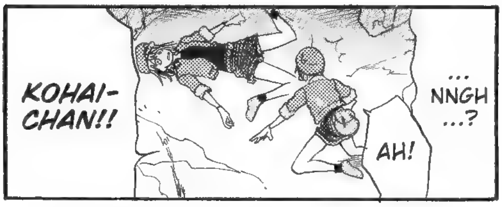
*Page 71*

White Blood Cell's exclamation as he tears into the bacterium is an expression of macho self-aggrandizement that may derive from the words "ore da," which are a particularly brash and masculine way of saying "it's me!"

However, the phrase has become best known for being a recurring catchphrase in *JoJo's Bizzarre Adventure,* Hirohiko Araki's long-running manga series, where (as it is here) it's shouted during an attack, typically with many more than the three repetitions White Blood Cell uses here.






...NNGH ...?
AH!
KOHAI-CHAN!!

## Kohai-chan

*Page 85*

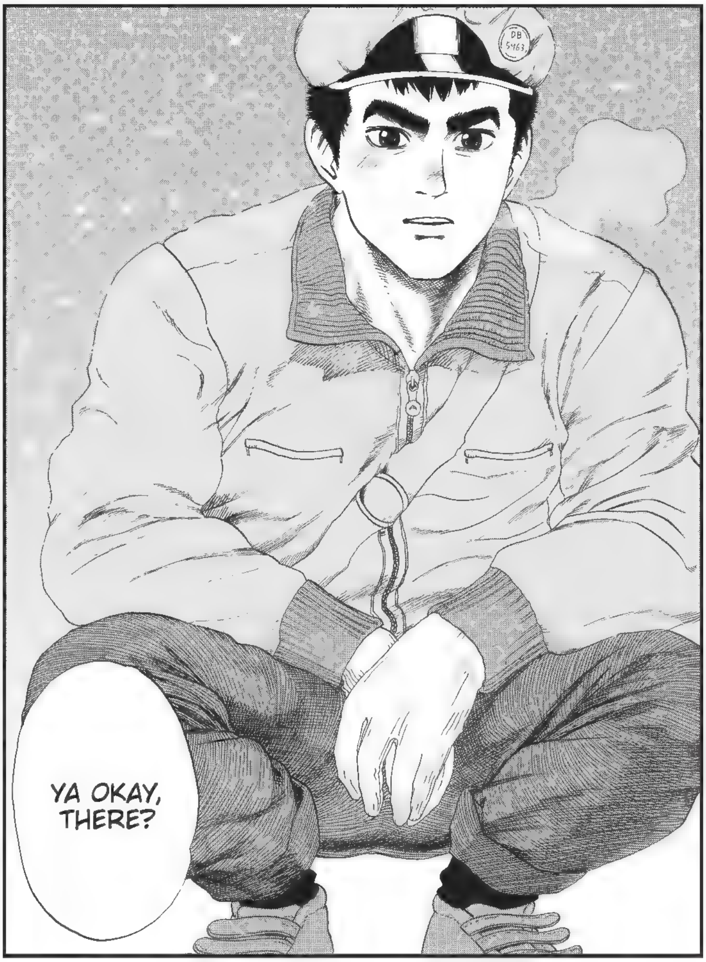
In Japanese the suffix "*-chan*" is a diminutive honorific that denotes affection as well as implying a certain degree of social seniority on the part of the speaker. Like most honorifics in Japan, it would typically be used in conjunction with a proper name.

Red Blood Cell's usage of *-chan* with the term *kohai* is as charmingly eccentric (and slightly airheaded) as you might expect it to be.

## Kansai dialect

*Page 109*

The transfused red blood cells that save the day are immediately identifiable as unusual because of their speech. Starting with the very first line, they use the dialect of the Kansai region of Western Japan—an area which includes Osaka, Kyoto, and Kobe. *Kansai-ben*, as it's known in Japanese, is strongly associated with the heartily mercantile culture of Osaka, and is typically thought to sound earthier and jauntier than standard Tokyo-area Japanese.



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はたらく細胞

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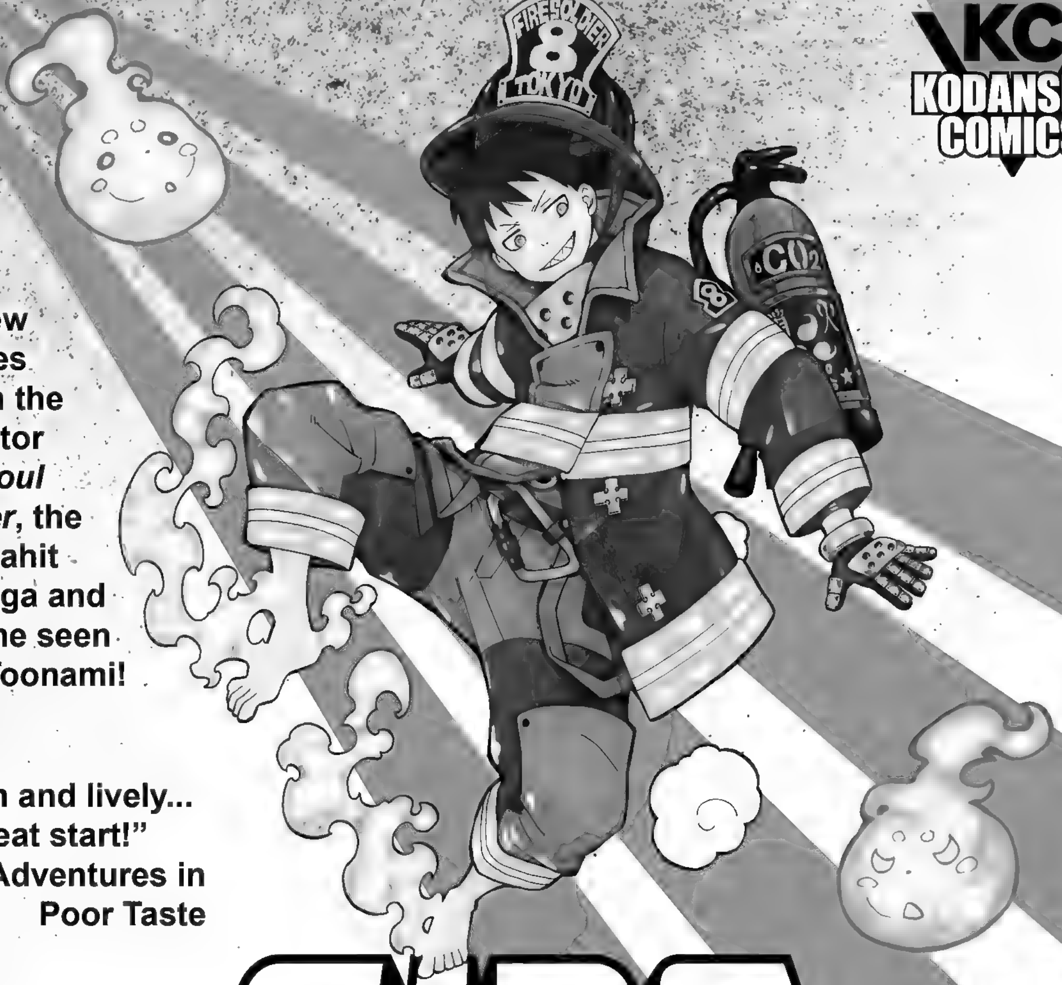

# FIRE FORCE

By Atsushi Ohkubo

The city of Tokyo is plagued by a deadly phenomenon: spontaneous human combustion! Luckily, a special team is there to quench the inferno: The Fire Force! The fire soldiers at Special Fire Cathedral 8 are about to get a unique addition. Enter Shinra, a boy who possesses the power to run at the speed of a rocket, leaving behind the famous “devil’s footprints” (and destroying his shoes in the process). Can Shinra and his colleagues discover the source of this strange epidemic before the city burns to ashes?

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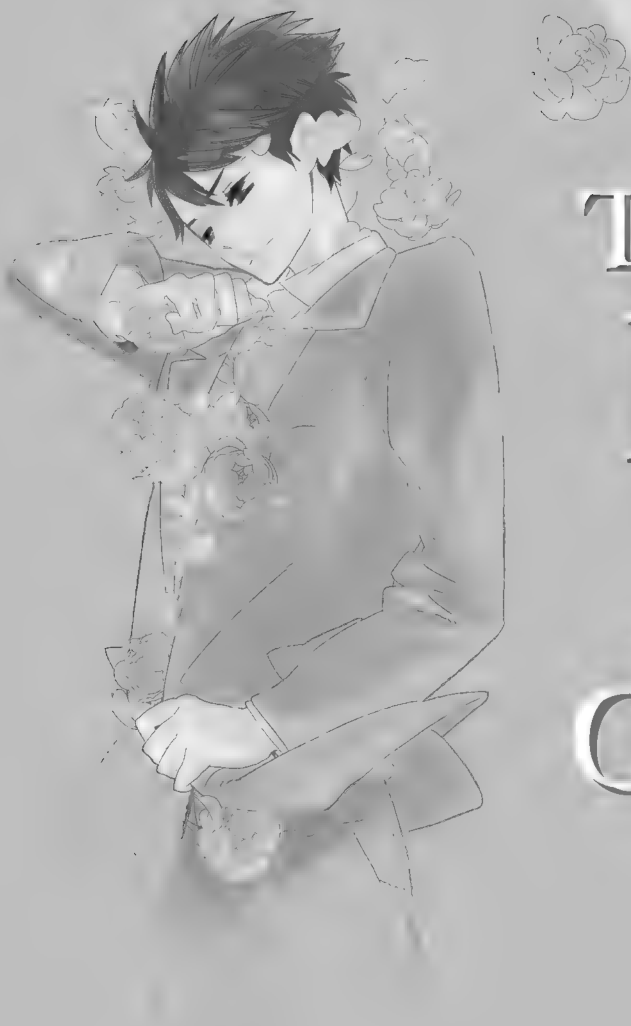

KODANSHA COMICS

"I'm pleasantly surprised to find modern shojo using cross-dressing as a dramatic device to deliver social commentary... Recommended."

-Otaku USA Magazine

the prince in his dark days

By Hico Yamanaka

A drunkard for a father, a household of poverty... For 17-year-old Atsuko, misfortune is all she knows and believes in. Until one day, a chance encounter with Itaru–the wealthy heir of a huge corporation–changes everything. The two look identical, uncannily so. When Itaru curiously goes missing, Atsuko is roped into being his stand-in. There, in his shoes, Atsuko must parade like a prince in a palace. She encounters many new experiences, but at what cost…?

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"Parasyte fans should get a kick out of the chance to revisit Iwaaki's weird, violent, strangely affecting universe. Recommended." -Otaku USA Magazine

"A great anthology containing an excellent variety of genres and styles." -Manga Bookshelf

Based on the critically acclaimed classic horror manga

The first new *Parasyte* manga in over 20 years!

NEO Parasyte f

BY ASUMIKO NAKAMURA, EMA TOYAMA, MIKI RINNO, LALAKO KOJIMA, KAORI YUKI, BANKO KUZE, YUUKI OBATA, KASHIO, YUI KUROE, ASIA WATANABE, MIKIMAKI, HIKARU SURUGA, HAJIME SHINJO, RENJURO KINDAICHI, AND YURI NARUSHIMA

A collection of chilling new *Parasyte* stories from Japan's top shojo artists!

Parasites: shape-shifting aliens whose only purpose is to assimilate with and consume the human race... but do these monsters have a different side? A parasite becomes a prince to save his romance-obsessed female host from a dangerous stalker. Another hosts a cooking show, in which the real monsters are revealed. These and 13 more stories, from some of the greatest shojo manga artists alive today, together make up a chilling, funny, and entertaining tribute to one of manga's horror classics!

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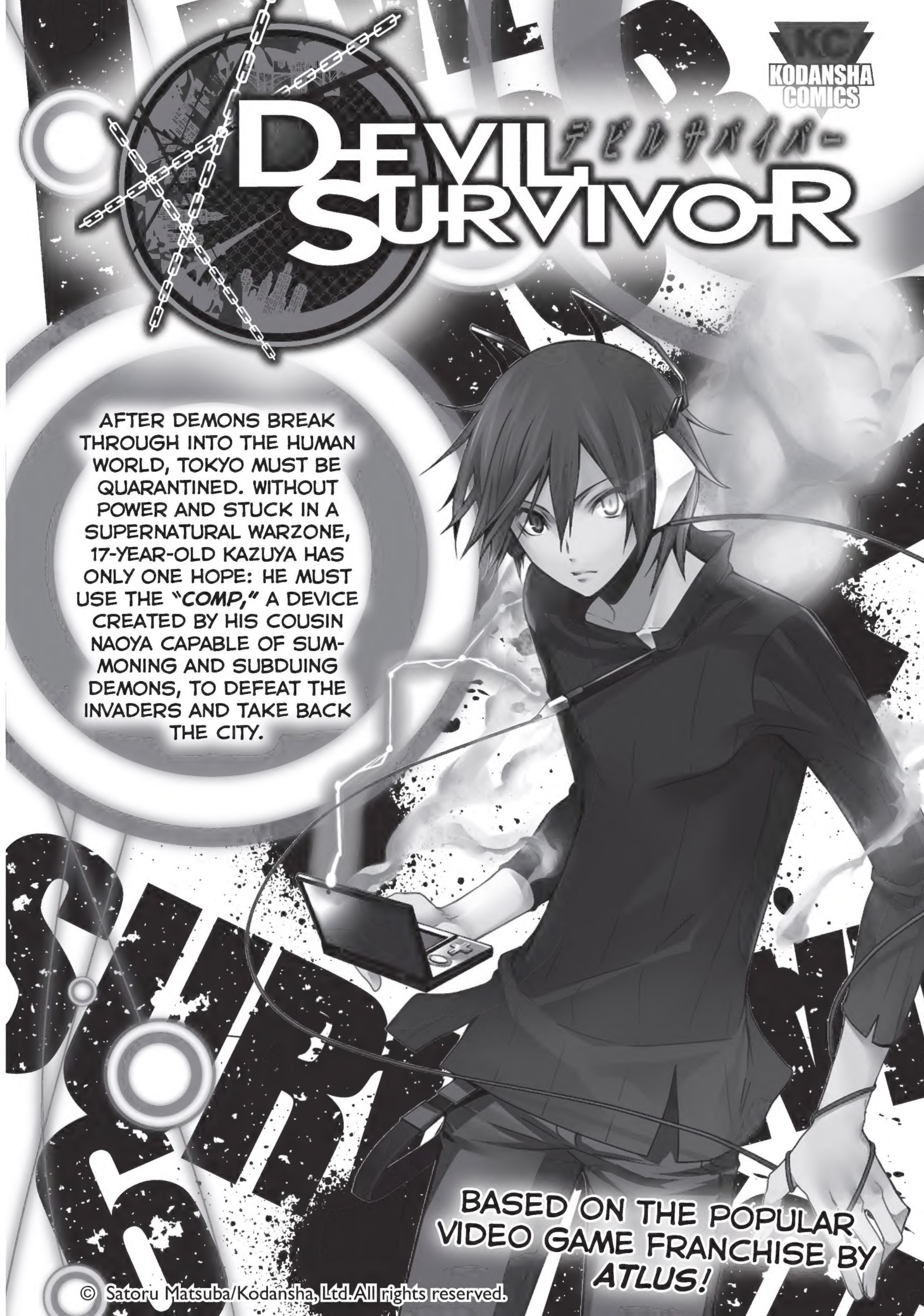
*New action series from Takei Hiroyuki, creator of the classic shonen franchise Shaman King!*

In medieval Japan, a bell hanging on the collar is a sign that a cat has a master. Norachiyo's bell hangs from his katana sheath, but he is nonetheless a stray — a ronin. This one-eyed cat samurai travels across a dishonest world, cutting through pretense and deception with his blade.

NEKOGAHARA
STRAY CAT SAMURAI

By
Hiroyuki Takei



AFTER DEMONS BREAK THROUGH INTO THE HUMAN WORLD, TOKYO MUST BE QUARANTINED. WITHOUT POWER AND STUCK IN A SUPERNATURAL WARZONE, 17-YEAR-OLD KAZUYA HAS ONLY ONE HOPE: HE MUST USE THE "*COMP*," A DEVICE CREATED BY HIS COUSIN NAOYA CAPABLE OF SUMMONING AND SUBDUING DEMONS, TO DEFEAT THE INVADERS AND TAKE BACK THE CITY.

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"This series never fails to put a smile on my face."
-Dramatic Reviews

"A very funny look at what happens when two strange and strangely well-suited people try to navigate the thorny path to true love together."
-Anime News Network

My Little Monster

OPPOSITES ATTRACT...MAYBE?

Haru Yoshida is feared as an unstable and violent "monster." Mizutani Shizuku is a grade-obsessed student with no friends. Fate brings these two together to form the most unlikely pair. Haru firmly believes he's in love with Mizutani and she firmly believes he's insane.

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KC
KODANSHA COMICS

**Cells at Work! 4**

KODANSHA COMICS Digital Edition

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